



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

24503375946



LANE MEDICAL LIBRARY STANFORD  
NBS MAG 1981  
The medical effects of the retention in 1

URAE MILA.





**FISKE FUND PRIZE ESSAY.**

---

**THE MORBID EFFECTS**

**OF THE**

**RETENTION IN THE BLOOD**

**OF THE**

**ELEMENTS OF THE URINARY SECRETION.**

**LANE LIBRARY**  
BY

**WILLIAM WALLACE MORLAND, M. D.,**

**MEMBER OF THE BOSTON SOCIETY FOR MEDICAL IMPROVEMENT;  
ONE OF THE ATTENDING SURGEONS AT THE CENTRAL OFFICE OF THE BOSTON  
DISPENSARY, ETC.**

**BEING THE DISSERTATION TO WHICH THE FISKE FUND PRIZE  
WAS AWARDED, JULY 11, 1860.**



**PHILADELPHIA:  
BLANCHARD AND LEA.**

**1861.**

**EW**

The Trustees of the Fiske Fund, at the annual meeting of the Rhode Island Medical Society, held in Newport, July 11, 1860, announced that the premium of one hundred dollars offered by them on the following subject: "The morbid effects of retention in the blood of the elements of the urinary secretion," had been awarded to the author of the dissertation bearing the motto—

*"Prius cognoscere, dein sanare."*

And upon breaking the seal of the accompanying packet, they learned that the successful competitor was ~~Wm. W. Morland, M.D., of Boston, Mass.~~

JAMES H. ELDRIDGE, M. D., East Greenwich,

CHARLES W. PARSONS, M. D., Providence,

HENRY E. TURNER, M. D., Newport,

*Trustees.*

S. AUG. ARNOLD, M. D., Providence,

*Secretary of the Fiske Fund.*

PHILADELPHIA:

COLLINS, PRINTER, 705 JAYNE STREET.

Y 85  
M 86  
1861

## PUBLISHERS' NOTICE.

---

DR. CALEB FISKE, who was President of the Rhode Island Medical Society in 1823 and 1824, at his death bequeathed to that Society a fund of two thousand dollars, directing the annual income to be expended in premiums for Essays on subjects selected for competition. The first premium of forty dollars was awarded June 27th, 1836, since which time a large number of valuable dissertations has been laid before the profession through the instrumentality of Dr. Fiske's well-directed munificence. By the judicious management of the Trustees, the Fund has gradually increased, and they are now able to offer two annual prizes of one hundred dollars each.

The Dissertation contained in the present volume received a prize in 1860, and the Trustees have desired that it should be put in a permanent form for consultation and reference, under the belief that it presents a condensed résumé of what is known concerning one of the most interesting pathological questions at present occupying the attention of the profession. It has, therefore, been reprinted from the *American Journal of the Medical Sciences* for April and July, 1861, in which it originally appeared.

PHILADELPHIA, July, 1861.



FISKE FUND PRIZE ESSAY.

---

ON THE EFFECTS OF THE RETENTION

OF THE

URINARY ELEMENTS IN THE BLOOD.

---

No organs in the human body play a more important part in the economy of life and health than the kidneys—their office is *the depuration of the blood*. In however slight a degree their function is interfered with, some untoward effects are produced. These may often be barely noticed, and easily recovered from; in many instances, however, although disregarded at first, they are sure of their ground, hard to be dislodged, and too frequently insidious and widely and surely destructive. The more open and overwhelming attacks of disease, which, by rapidly disabling the kidneys and extensively injuring their tissue, at once and distinctly tell upon the constitution, reveal in plain characters the close connection between the vital torrent and its purifying agents.

The subject, as proposed by the Trustees of the Fiske Fund, necessitates, *first*, the enumeration of “the elements of the urinary secretion;” and *secondly*, the recital of the effects produced by the undue “retention” of each of them in the blood.

By the expression “elements of the urinary secretion,” as here used, we understand its constituents in a state of health. These constituents, by a vital law, are to be eliminated from the blood; and their retention therein, beyond a certain time, will certainly cause “morbid effects.”

The following enumeration of the urinary elements is taken from one of the latest and most reliable authorities.<sup>1</sup> The analysis is made up from an average of the composition of all the urine passed in twenty-four hours. *Average quantity* from twenty-four hours, 1400 to 1600 cubic centimetres;

<sup>1</sup> J. L. W. Thudichum, M. D., Lecturer on Chemistry at the Grosvenor Place School of Medicine, &c. “A Treatise on the Pathology of the Urine, including a Complete Guide to its Analysis.” London, 1858.



49 to 56 fluidounces. *Average specific gravity*, 1.020. *Mean amount of solids*, 55 to 56 grammes (a gramme is 15.4440 grains, English).

*Constituents.*

Water . . . . .	1345 to 1534 grammes.	
Urea . . . . .	30 to 40 "	463 to 617 grs.
Uric Acid . . . . .	0.5 "	or 7.5 "
Creatine . . . . .	0.3 "	or 4.5 "
Creatinine . . . . .	0.45 "	or 7.0 "
Sarkine	undetermined.	
Uræmatine }		
Uroxanthine }		
Hippuric Acid . . . . .	0.5 "	or 7.5 "
Chlorine . . . . .	6 to 8 "	92 to 123 "
(or Chloride of Sodium . . . . .	10 to 13 "	154 to 200 ")
Sulphuric Acid . . . . .	1.5 to 2.5 "	23 to 38 "
Phosphoric Acid . . . . .	3.66 "	56 "
Potash and Soda }	undetermined.	
Lime and Magnesia }		
Earthy Phosphates . . . . .	1.28 grammes,	19 "
Iron . . . . .	undetermined.	
Ammonia . . . . .	0.7 grammes,	10 "
Trimethylamine }	undetermined.	
Carbonic Acid }		
Phenylic Acid }		
Damaluric Acid }		

"The minor estimates account for 48 out of 55 grammes of solids, the larger estimates for 62 out of 66 grammes of solids."—THUDICHUM, *op. cit.*

From an examination of the above table, in connection with the requisitions of the subject, it will be evident that we have only to indicate the pathological effects arising from the undue retention in the blood, of the following constituents of the urinary secretion: Water; Urea; Uric Acid; Creatine; Creatinine; Hippuric Acid; Chlorine; Chloride of Sodium; Sulphuric Acid; Phosphoric Acid; Earthy Phosphates, and Ammonia. The other ingredients of the urine, mentioned as being found in "undetermined" proportions, cannot enter into the list, in a practical consideration of the subject.

**WATER.**—Taking up the urinary constituents in succession, we first examine the results to be observed when that amount of *water* which should be excreted through the agency of the kidneys, is not so evacuated. This portion of our subject may be comprehensively disposed of.

A very variable amount of fluid is evacuated from the bladder at different seasons of the year, and under peculiar and differing circumstances. Thus, in cold weather, the amount of urine is greater, because the cutaneous transpiration is less. Again, when large amounts of liquids are

ingested, somewhat corresponding quantities are excreted by the kidneys. The action of abnormally produced sugar occasions diabetes; certain medicines induce or augment, whilst others restrict, or nearly suspend, the urinary flow. Organic disease, or accidental obstruction, may cause almost complete cessation of urination; and entire *anuria*, although rare, occurs, from well-known causes.

Whatever, therefore, essentially diminishes, or actually suspends, for a longer or shorter time, the urinary evacuation, causes the retention in the blood of *all* the constituents of the urine, or of a goodly proportion of them. The deleterious effects consequent upon such a retention, will be referable, in the main, to the presence of the solid constituents of the urine, rather than to that of an unusual supply of the watery vehicle. A certain amount—a redundance, even—of water, is absolutely necessary in the circulation, in order to eliminate, wash out, and bear on, as through a sewer, the effete, nitrogenous products, foreign to life, and incompatible with the integrity of the blood. And, besides this necessity for a surplus amount of water, it is rare that enough more than a normal amount is retained in the blood, to be of essential consequence, compared with the effects arising from the presence of the solids of the urinary secretion, prevented from issue by the same cause or causes which retain the watery portion. It is true, however, that “when urea is retained, water is also mostly retained in part, and, by its effusion into the cavities and cellular tissue, causes dropsical disease.” (*Thudichum*, op. cit., p. 75.) But the action of the causes just alluded to is rarely or never sufficiently long maintained to be efficient in producing a deteriorated condition of the blood, *referable to excess of water alone*, the kidneys being healthy. Other morbid influences, arising from the presence of the solids of the urinary secretion, and the persistent action of the retaining cause upon the organs themselves, would produce far more rapid and appreciable effects upon the system at large, and upon the blood, than a simple increase of water, only, could do. It is acknowledged, however, that scanty urine—diminished both as to solid and fluid constituents—is indicative of a greater or less degree of anæmia. On the other hand, symptoms of hydruria may be favourable in certain diseased conditions—as where hydræmia and dropsy exist—and its actual establishment, either naturally or by artificial diuresis, may carry off the misplaced water, and restore the balance of the circulation. The profuse flow of watery urine in hysteria is often critical—at all events, *per se*, it indicates no blood-disease. Co-existent anæmia, in such cases, doubtless depends on some other cause than retention of the water of the urine in the blood, or its mere redundance. Often, also, where the quantity of urine excreted is very small, the skin, the bowels, and even the lungs, act *quasi* vicariously, and thus prevent or diminish any ill effects attributable to scantiness of evacuation of the watery portion of the urine. It is well known, also, that the skin will eliminate urea, in cholera, in such quantities that it

not only can be detected, but the amount appreciated. (*Thudichum*, op. cit., *et alii*.)

We may now dismiss the watery element from our subject, and proceed at once to the consideration of the undue retention of the solid constituents of the urine in the blood.

UREA.—(Symbol:  $\overset{+}{U}$ .—Formula:  $C_2H_4N_2O_2$ .)<sup>1</sup>

This substance, "the principal product of the metamorphosis in the body of nitrogenized food," and always a constituent of healthy urine, is considered a blood-poison when retained in the circulation. Some observers believe its action to be direct, others that it is indirect—or exerted through the agency of a product of its decomposition. It forms the most considerable portion of the solids of the urinary secretion, and is purely excrementitious matter, the elimination of which by the kidneys is absolutely necessary to health and life. It is true that, in certain exceptional instances, large quantities of it have been ascertained to be present in the blood, for a long time, without compromising life, or even exciting those cerebral symptoms usually observed under such conditions; but it is to be presumed, either that the persons were, to a great extent, insusceptible of the action of urea, or else that the peculiar fermentation supposed to give rise to uræmic poisoning, by producing a noxious substance from the urea, did not take place. It is certainly very possible that some persons may be less impressed by the presence of urea in the blood than others; but, we repeat, such cases must be entirely exceptional. With regard to the constancy of decomposition of urea when retained in the blood, and the consequent formation of another and a toxic substance, we have, as yet, too few facts to enable us to determine. If ever proved to be the rule, however, the intervention of certain unknown agencies might, in isolated instances, prevent its execution; and thus account for an apparent, or at least a temporary, immunity from morbid consequences.

After extirpation of the kidneys in animals, and in Bright's disease and some other affections, urea is found pervading many of the fluids of the body—as, the dropsical effusion, the blood, the perspiratory secretion, the vitreous and aqueous humours, and the liquor amnii.<sup>2</sup> Dr. Thudichum, who

<sup>1</sup> Bird, Thudichum, *et al*.

*Chemical Composition of Urea.*

	THUDICHUM.	G. BIRD.
2C . . . .	20.000	$C_2N_2H_4O_2 = 60.$
4H . . . .	6.666	
2N . . . .	46.667	
2O . . . .	26.667	
	<hr/> 100.000	

<sup>2</sup> The presence of urea in the fluids of the body was first announced by Dr. Christison in the *Edinburgh Medical and Surgical Journal*, October, 1829.

refers to its detection in the ~~last~~ fluid by Wöhler, considers its presence there as exceptional; and is inclined, moreover, to throw doubt upon many of the reported instances of its occurrence in other fluids—the reports being in several instances merely assertions by the authors, and not ratified by proof, or else erroneously or partially quoted. Urea has also been declared to have appeared in the milk,<sup>1</sup> in the serum from blisters, and in the alvine evacuations of patients with diseased kidneys.<sup>2</sup> Dr. Rees states that he has “found most unequivocal evidence of its presence in peritoneal, pericardial, and pleural effusions, and also in the fluid of the arachnoid.”<sup>3</sup>

With regard to the question, already alluded to, whether urea retained in the blood is directly or indirectly deleterious—that is, whether it acts *per se* as a poison, or becomes such by a process of decomposition, in which case the carbonate of ammonia is believed to be the injurious agent—there has, of late, been much discussion. The latter view has its zealous advocates, and their theory seems to be somewhat gaining ground. As we have already intimated, there are significant facts adverse to the conclusion that urea alone, as such, is a blood-poison. Dr. Bright remarked that urea may long exist in the blood, in renal disease, and yet no cerebral symptoms arise until the very last of life. He mentions one case which lasted from four to five years. Dr. Rees gives even stronger testimony. He found, in a patient who had no uræmic symptoms whatever, but who retained his cerebral functions to the last moment of his life, the blood more highly charged with urea than he had ever known it in Bright’s disease. Dr. Johnson, of London, in his justly celebrated work on diseases of the kidneys, affirms that no actual proof exists that urea is the poisonous agent, or, at least, that it is the only one. If admitted to have a poisonous influence, he holds that some peculiar, unknown condition of the blood must exist, to favour its toxic action. Frerichs is the author of the theory that carbonate of ammonia, resulting from a decomposition which the urea undergoes in the blood, is the poisonous agent. Its presence in the blood he indubitably ascertained, and by injecting it into the bloodvessels of dogs, he produced convulsions. Dr. Hammond, U. S. A., has made some interesting experiments, with the intention of testing this matter. He injected urea, vesical mucus, sulphate of soda, nitrate of potash, and carbonate of ammonia into the blood of dogs; in some instances removing the kidneys previous to injecting the substances. He did not detect ammonia in the breath of any of the animals operated on with *urea* by injection. He inclines to pronounce its presence in Frerichs’s cases purely accidental. The animals from whom the kidneys were removed all died, after strong convulsions; and Dr. H. infers an analogy between animals deprived of the kidneys and patients affected with

<sup>1</sup> Rees, *Diseases of the Kidney*, London, 1850, p. 46. Albuminuria existed in the patient.

<sup>2</sup> Dr. Golding Bird—after the action of elaterium.—*Urinary Deposits*.

<sup>3</sup> *Loc. cit.*

Bright's disease. Such analogy, it is true, may be predicated; but many attendant circumstances attaching to the cases of persons with diseased kidneys do not, of course, affect animals *without* kidneys, and consequently the analogy is not perfect, and hardly as safe to reason from as even the proverbially insecure foundation derived from analogical reasoning generally. Dr. Hammond does not find that urea or carbonate of ammonia, injected into the bloodvessels of sound animals, causes death; if they have suffered extirpation of the kidneys, such injection proves fatal. He does not discover from his experiments that urea, introduced directly into the circulation, becomes converted into carbonate of ammonia.<sup>1</sup> The experiments, at all events, go to prove the deleterious agency of urea, or of the product of its decomposition, when not promptly excreted from the blood, whether it be due, as in the case of the animals experimented upon, to loss of the kidneys, or, as in certain conditions in the human subject, to its retention in the blood by diseased, perverted, or obstructed action of those organs. While the question as to the exact material acting poisonously is still in abeyance, the *facts* relative to urea retained in the blood as productive of various "morbid effects," are indisputable, and as such we shall now proceed to examine them.<sup>2</sup>

GENERAL PHENOMENA REFERABLE TO THE PRESENCE OF UREA IN THE BLOOD.—From the fact that Bright's disease is the affection in which urea is most frequently retained in the blood, it will be all the more necessary not to refer any of its concomitant phases to the action of urea solely; although it is very plausible, and some of the best medical observers of the present day are beginning to teach, that many of the so-called *sequelæ* of Bright's disease may legitimately be referred to the presence of urea in the circulation. Thus, Dr. Watson remarks the extreme readiness of various organs of the body to become inflamed during an attack of Bright's disease. Especially is this found to be true, as all observers will testify, in reference to the serous and mucous membranes. Dr. Watson himself calls attention to this fact, and cites Drs. Bright, Christison, and Gregory to the same effect. He mentions, also, that M. Solon does not, in his volume on albuminuria, consider this tendency especially prominent in France.

Bronchial, pleural, pericardial, peritoneal, gastric, and intestinal inflammations are well-known and common *sequelæ* of Bright's disease, and occur, as to frequency, very nearly in the order above named. Now, it is very plausible to suppose that the abnormal condition of the blood, caused by the presence of urea, may be productive of many of these manifestations. Dr. Watson, while suggesting this, speaks particularly of disorder of the stomach and bowels, which so often follows or is concomitant of

<sup>1</sup> North American Medico-Chirurgical Review, March, 1858.

<sup>2</sup> See Appendix, note A.

Bright's disease, and considers it may be explained by the action of "the poisonous material retained in the blood, and seeking a vent through supplementary channels of excretion."<sup>1</sup> He then refers, as corroborative proof, to the *post-mortem* appearances observed in these cases; "most commonly evident traces of disease are met with in various organs" besides the kidneys. This distinguished observer adds, that these manifestations "prevail with irregular frequency in different places. They are probably determined, in some measure, by local and peculiar agencies. Thus, vomiting and diarrhoea have been more familiar to the Edinburgh observers, than in London to Dr. Bright, or in Paris to M. Solon; while the headaches and coma so often witnessed by the British physicians have been comparatively uncommon in France."<sup>2</sup>

Although, in abnormal retention of urea in the blood, the vital tissues and fluids are all more or less affected, and, by a concomitant disturbance of the watery as well as of the solid portions, dropsical effusion may arise, yet the spinal cord and brain are the organs chiefly affected whenever urea becomes a blood-poison; and we have seen that the instances where it is not thus morbidly efficient, when retained in the blood, are exceptional. Generally speaking, when the amount of urea thus traversing the system is considerable, its effects are decided and rapidly disastrous. The affection is, properly, a cachectic condition; in other words, the system is, throughout, evidently depressed by a poison.<sup>3</sup> Were it not, moreover, that the disease of the cerebro-spinal system, consequent on uræmia, is usually so severe, persistent, and fatal, the blood would become very seriously altered in its constituent parts, and finally devitalized, by the retention of urea; and, in addition, the whole play of the vascular system would be disturbed. The large quantities of albumen often eliminated during the retention of unusual amounts of urea in the blood cannot be said to be referable to the presence of urea alone. Albuminuria and uræmia may coexist, but the union is not a necessary one; neither is directly causative of the other. This fact we find pertinently referred to by Prof. G. S. Bedford, in his short but instructive chapter on uræmia.<sup>4</sup>

<sup>1</sup> M. Claude Bernard (*Leçons sur les Propriétés Physiologiques et les Alterations Pathologiques des Liquides de l'Organisme*. Paris: J. B. Baillière, 1859) remarks that in renal disease, when the urine is suppressed, intestinal disorder supervenes. The bowels have taken up, so far as they can, the elimination of urea. The rule is, that there is an elective affinity manifested by certain glands in the elimination of certain products from the blood. When anything interferes with their action, others fulfil their office to the best of their ability.

<sup>2</sup> Lectures on the Principles and Practice of Physic, fourth edition, London, 1857, vol. ii. p. 682.

<sup>3</sup> Notwithstanding that many of the cerebro-spinal phenomena observed are those of irritation or excitation.

<sup>4</sup> Clinical Lectures on the Diseases of Women and Children.

If we were to investigate thoroughly the disturbed chemistry and proportions of the blood which might properly be imputed to retention therein of the solid constituents of the urine, the limits of an essay, such as the requirements of the question now proposed seem to demand, would be soon attained, and, by the addition of the practical details, largely exceeded. We have interpreted the terms of the subject as indicating a desire for an exposition of the phenomena of disease believed to be legitimately referable to the abnormal retention of the solid urinary constituents; and whilst endeavouring to present these, most of the results of the disturbed proportions and composition of the blood will, in fact, be made evident. And, in concluding these general remarks, it is well to say that accomplished observers, some years since, have been inclined to ascribe many manifestations of disease of slight intensity, and previously obscure and very imperfectly understood, to the presence of abnormal quantities of urea in the blood.<sup>1</sup>

I. CEREBRO-SPINAL PHENOMENA ATTRIBUTABLE TO UREA RETAINED IN THE BLOOD.—(A.) A drowsy condition is often the first distinctly declared manifestation of toxæmia by the presence of urea or of the product of its decomposition in the blood. There are sometimes premonitory symptoms of less clear significance, but not always. Some writers, however, class them among the recognized *prodromata*.<sup>2</sup> This drowsy state ordinarily deepens into stupor and true coma, if it be impossible to relieve the blood of the offending element. The re-establishment of free diuresis, or a tendency to recovery from renal disease, may effect so desirable a result; but, unfortunately, the tide too frequently sets in the opposite direction. Coma may prove the final phase of the affection, and be simple or unaccompanied by disordered motility; or it may be combined with convulsions, and life may be terminated even more rapidly than if the complication had not existed.

(B.) Convulsions of an epileptic form may be the sole manifestation; there being no sopor, and consciousness being intact. The state is, in every respect, fully as unpromising as either of the two just indicated.

Among the first symptoms of uræmia may be mentioned—œdema in

<sup>1</sup> Urea is always present in healthy blood, but in very small proportion. It may sometimes even not be readily recognized. Morbid effects, consequently, depend upon its presence in large quantities, and upon its *accumulation*, in the blood. The abnormal increase, therefore, even if small, will exert an influence. For valuable chemical and physiological information on this point, see the works of Simon, Thudichum, and Carpenter.

<sup>2</sup> These will be specified hereafter; they are of a character less arrestive of attention than the others; we will only mention—confusion of ideas, failure of memory, unusual sluggishness, general *malaise*.

various parts of the body;<sup>1</sup> lowness of spirits, amounting at times to melancholia; restlessness; dizziness; headache; fretfulness; partial anæsthesia and delirium. Nausea, retching, vomiting, and rigors, are likewise noticed. There are often, also, impaired vision, amblyopia, *muscæ volitantes*, and amaurosis. These latter symptoms, as indeed all the others, are especially mentioned by Dr. Braun, of Vienna, in his late work on Midwifery; a chapter from which, devoted to Uræmic Eclampsia, has been ably translated by Dr. Duncan, of Edinburgh, and has furnished us with a great deal of new and valuable information. While Dr. Braun's views with regard to the subject of uræmic eclampsia will, doubtless, not be at present received as a whole by the profession, and are, indeed, questioned in many points by his translator, yet his extensive research, accurate observation, admirable description, and ingenious reasoning, render the chapter to which we refer at once entertaining, instructive, and full of practical suggestions. We acknowledge our great indebtedness to the author and his translator.

When stupor and coma finally supervene, a greater or less degree of apoplectic stertor accompanies the respiration. It is uniformly noticed that this stertor has a peculiarly *high tone*—a sort of shrillness, distinguishing it from ordinary apoplectic snoring. Reference was first made to this fact by Addison (*Guy's Hospital Reports*, 1839, No. VI.), and is repeated by Reynolds (*Diagnosis of Diseases of the Brain*, &c., London, 1855) and by Rees (*On Diseases of the Kidney*, 1850).<sup>2</sup>

<sup>1</sup> This peculiar feature of the affection deserves especial notice. Its seats are chiefly the upper part of the body, the face, and the extremities—both upper and lower. The *labia majora* not infrequently exhibit it. Change of the patient's position often causes its disappearance, temporarily; and it frequently becomes less marked, or even vanishes, towards the end of pregnancy, even while the albumen of the urine and the structural disease of the kidneys is increasing. (Braun.) "The skin of the non-œdematous parts of the body appears very dry, and as white as chalk (chlorotic, hydræmic, leukæmic), and has a low temperature. Only those œdemata of pregnant women which exist contemporaneously with albumen, fibrin cylinders, and fatty degenerated scales of Bellini's epithelium in the urine, have a connection with uræmic eclampsia. The œdema of the lower extremities, ascites, and hydramnios, which are not complicated with albuminous urine containing fibrin cylinders, are not followed by uræmic eclampsia in pregnancy and labour. The affection of the kidneys with disease cannot certainly be inferred from the appearance of dropsy, as distinct causes may, at the same time, or one after the other, produce dropsies." (Braun, *Uræmic Eclampsia*; Duncan, p. 17.)

<sup>2</sup> Dr. Reynolds, commenting upon this characteristic, writes thus: "The stertor exhibits a peculiarity first noticed by Dr. Addison. It is not of low, guttural tone, but of much higher pitch, and appears to be caused by the mouth rather than the throat, either by some position of the tongue against the roof of the mouth or teeth, or by some movement of the arches of the palate, not like that causing ordinary stertor, from which (although its mechanism is obscure) it presents the most obvious difference. (In several obscure cases—i. e., obscure from the fact of the



The action of the poisonous agent in uræmia is believed by the best authorities (Tyler Smith, Braun, Reynolds, Churchill, *et al.*) to be first directed to the spinal marrow; and hence the sensitive impressions which make themselves morbidly apparent, as dizziness, headache, and subsequently convulsive movements. We are not to inquire into the *modus operandi* or etiology of uræmia, or of the other diseased conditions supervening in the human subject, upon retention of the elements of the urinary secretion in the blood; but—as we understand the question—to state the “morbid effects” only; consequently, we shall not occupy time and space by setting forth the received views and theories as to the direct or indirect modes of transmission of the deleterious influences, but will endeavour to state succinctly the disordered vital phenomena observed, and the pathological appearances, if any, which are noted *post mortem*.

Uræmic symptoms may, of course, arise in both sexes from renal disease, or from mechanical obstruction to the excretion of the urine, as in hydro-nephrosis, retroversion of the uterus, urethral stricture, and closure of the ureters; which latter, if dependent on an unrelievable cause, must soon prove fatal. The occurrence of what has been termed “uræmic eclampsia” has been witnessed in non-pregnant females, and in males, and so cannot be considered as invariably belonging to the parturient state when urinæmia exists. The portion of Dr. Braun’s work already cited, is devoted to the exposition of his belief that the convulsions observed during pregnancy are almost exclusively dependent on urinæmia.

After the appearance of the premonitory and of the earlier symptoms of uræmia, the progress of the mischief will, of course, be variable in different patients, and also according to the amount and *cause* of the retention of urea. Thus, it would seem natural that a large amount of urea being somewhat *suddenly* thrown into the circulation, and kept there by the continuance of the cause, should prove rapidly disastrous, and be accompanied with marked and violent phenomena. When gradually introduced, as in the

patient’s not having come under notice until cerebral symptoms had appeared and consciousness was so far lost that no commemorative history could be obtained, and in which no œdema of the ankles was perceptible—this peculiarity of the respiratory stertor has at once awakened my suspicions; has led to an examination of the urine and the breath, and to the discovery in the former of albumen and fibrinous casts, and in the latter of an undue quantity of ammonia.” (*Op. cit.*, p. 110.) The latter fact is significant, in view of the doctrine of Frerichs as to the agent which proves poisonous in uræmia; and the experiments and observations of many others go far to confirm the opinion.

Dr. Reynolds adds: “The peculiar muscular condition causing this stertor, I am disposed to consider as the result of spasm rather than paralysis, and the spasmodic contraction may be either of sensori-motor, simply reflex, or tonic origin, forming only one of many phenomena which indicate excessive or perverted conditions of those groups of motor action. This hypothesis is, of course, as unimportant as the fact of the difference is valuable.”

slower advances of renal disease, or by the action of a progressive obstruction, the system may become somewhat accustomed to the presence of the deleterious agent. May not this be, in some degree, the explanation of the innocuousness of those very considerable amounts of urea the presence of which in the blood, and for a prolonged period, was ascertained by such accurate observers as Bright, Christison, Frerichs, and Rees; in conjunction, as we have previously intimated, with a possible greater power of resistance to the urea-poison in some constitutions than in others?<sup>1</sup> If this explanation be not in any degree admitted, the only alternative seems to be to accept the theory of Frerichs, that carbonate of ammonia is the toxic agent. In support of this view, we have the experiments upon animals, already referred to, in part, where extirpation of the kidneys was practised—as by Prevost and Dumas, Segalas, Tiedemann, Gmelin, Mitscherlich, Claude Bernard, Barreswil, Stannius, and Frerichs, all cited by Dr. Bedford to prove this point (*op. cit.*); and the test by injection tried by Bichat, Courten, Gaspard, Vauquelin, Segalas, Stannius, Frerichs; both methods without inducing convulsions. (*Idem.*) Dr. Bedford also mentions the significant fact that Vauquelin and Segalas proposed to give urea as a diuretic, so little did they consider it a poison! It is, under the present aspect of the subject, as well not to try the experiment.

Orfila—to come to direct experiments—caused fatal convulsions in an animal by the administration of carbonate of ammonia; and Bernard and Barreswil found carbonate of ammonia in the stomach and intestines of animals after extirpation of the kidneys.

Dr. Rees's idea that a peculiar "tenuity" of the blood may be requisite, in order to have full toxæmic action, when urea is retained, is certainly plausible; for we may at least suppose that the poisonous matter will be more readily and abundantly distributed through the circulating medium, and will consequently more thoroughly pervade and act upon the system.<sup>2</sup> And here we cannot refrain from adducing the exceedingly acute and ingenious remarks made upon this point by Prof. Simpson, of Edinburgh (*Obstetric Works*, vol. i. p. 371, American edition), in the article containing his statements in reference to puerperal convulsions, which latter, as we have already mentioned, recent observers have distinctly referred, in a large majority of cases, to toxæmia by the retention of urea, or of the product of its decomposition, in the circulation. In this particular connection, however, the patients were children—so that here we have remarkable instances of direct

<sup>1</sup> Frerichs states that the presence of the as yet unknown *ferment* in the blood is necessary, in order to the production of toxæmic symptoms by generation of the carbonate of ammonia. He thus explains the toleration of so much urea in certain cases.

<sup>2</sup> Dr. Todd ("Lumleian Lectures on Delirium and Coma," *Med. Gaz.*, 1850) also favours this idea. He believes the poisonous action of urea is facilitated by impoverished blood.

uræmic poisoning in connection with albuminuria—convulsions being the prominent symptom. The account of the first case we transcribe entire, together with a foot-note of much interest.

“A few weeks ago, I saw an instance in which convulsions in a child after birth were connected with the presence of albuminuria in its urine; or connected, as it should be, perhaps, more correctly stated, with that condition of the blood-poisoning or uræmia which is the result of albuminuria—whether that condition consists in a morbid accumulation of urea, or is produced, as Frerichs supposes, by the presence of carbonate of ammonia in the blood, produced by decomposition of the urea, or is, as is more probable, the effect of some other morbid agent in the circulating system, capable, like strychnia, of increasing the centric irritability or polarity of the spinal system to such an excessive degree that, under this super-excitability, comparatively slight eccentric causes of irritation in the stomach, intestines, uterus, bladder, &c. &c., readily induce convulsive attacks of a general form, like those of puerperal eclampsia.” (*Loc. cit.*)

In the foot-note appended to the above passage, and in reference particularly to the theory of Frerichs, Professor Simpson makes the following important and interesting suggestions:—

“If the blood-poison, which in albuminuria produces convulsions and coma, be, as Frerichs believes, carbonate of ammonia, resulting from decomposition of urea, can we account for the power of chloroform in restraining and arresting, as it does, puerperal convulsions, upon the ground of its preventing this decomposition? The inhalation of chloroform produces, as various chemists have shown, a temporary diabetes; sugar appears in the urine, and hence, probably, also in the blood. The addition of a little sugar to urine *out* of the body, prevents, for a time, the common decomposition of its urea into carbonate of ammonia.”

After mentioning the death of another child from convulsions supervening on the third day after birth—the mother having had puerperal convulsions and recovered—Dr. Simpson states that Dr. Weir, of Edinburgh, and himself found the urine of the child, like that of the mother, highly albuminous. He also says he is unaware of any reported observation of the coexistence of albuminuria and infantile convulsions; and then hints at the possibility that the albuminuria may be common as a pathological condition in certain forms of the convulsions of infants—as in trismus nascentium. Other infantile diseases, he thinks, may be powerfully influenced by albuminuria—as, for instance, sclerema, the “*endurcissement ou l’œdème du tissu cellulaire*” of French writers. Dr. Simpson had only seen two cases of this in Edinburgh, but was led, at the time of observing them, to believe and “to suggest that the skin-bound disease itself, or at least some forms of sclerema, may be a variety or effect of Bright’s disease in early infancy; the effusion into the cellular tissue, which constitutes the marked feature of the affection, being so far analogous to the anasarca occurring with albuminous nephritis.”

In reference to the use of chloroform, and the explanation which Dr.

Simpson attaches to its mode of action in overcoming puerperal or uræmic convulsions, may we not ask whether the subduing power of the anæsthetic agent, acting as it does upon the cerebro-spinal system, directly, is not sufficient, of itself, to explain the control of the convulsive manifestations, without a resort to the exceedingly ingenious suggestion of Professor Simpson as to the chemical explanation of the result?

We may here remark that, in one case, Dr. Duncan of Edinburgh found that the inhalation of chloroform aggravated the stertor and lividity of countenance observed in a case of puerperal convulsions ("uræmic eclampsia" of Braun and others). We observe that the chloroform was administered in "small quantity"—perhaps Dr. Simpson might say the amount was not sufficiently large.

In a valuable note to a portion of the chapter of Dr. Braun's work which he has translated, Dr. Duncan has virtually enunciated the same opinions as Dr. Simpson's, previously cited—both in reference to increase of the nervous irritability acting on various organs, and to the analogy of action to be predicated from the experiments instituted by zealous students of these phenomena upon animals. We append his comprehensive and apposite remarks:—

"In uræmia, the most important point is the circulation of a morbid fluid in the nervous system, which probably does not act as a direct excitant of the convulsive motions, so much as it increases the irritability of the nerves, and the consequent liability to convulsions from exciting causes, which, under other circumstances, would produce no noticeable disturbance. Ingenious experiments have, as is well known, been performed on frogs, which seem to demonstrate an analogous condition to exist under poisoning by strychnia, at least when moderate quantities of the poison are administered." (*Loc. cit.*, pp. 59, 60.)

When the peculiar conditions to which the retention of urea in the blood is due, can be relieved and removed, we may witness rallying, and final recovery, even from very unpromising states. Persistence of the cause, however, by maintaining the presence and increasing the amount of the poison, soon induces the gravest accidents, and must terminate fatally, sooner or later, according to the violence of the attack, and the power of resistance manifested by the patient. It will serve at once the purpose of illustrating this fact, and of furnishing a synoptical view of the effects of urinæmia, to recapitulate and condense the phenomena observed under the established morbid conditions of the affection.

1. *External Appearance of the Patient. (Early Stage.)*—Aspect, that of general feebleness; and, if the depraved state of the blood follow scarlatina or Bright's disease, a more marked pallor, than when other causes are operative in retaining the urea in the blood—together with a puffiness about the cheeks and eyelids. Generally, sallowness and anæmic hue, but sometimes blueness and congested appearance of the skin. More or less cedema of the extremities. Listless, confused, semi-idiotic manner.

(*Second Stage*).—Appearance that of a person apoplectically somnolent; degree, partial or complete; *modification*, by clonic contractions of the muscles.

(*Third Stage*).—Appearance that of one suffering from epileptic convulsions.

Either of the last two stages may be present singly, the other not occurring; or they may be combined and alternate.

2. *Disturbed Sensorial Manifestations. Early Stage.* (“Premonitory” of certain writers).—Impaired vision; transient, partial and incomplete amaurosis (Reynolds, *op. cit.*); *muscæ volitantes*; tinnitus aurium; temporary deafness.

(*Later Stages*).—Deficient, and sometimes entire loss of sensibility; complete amaurosis; permanent deafness—the latter less common. Sensation is seriously impaired, but not very frequently wholly lost. Distinct cognizance of impressions not taken; but usual appreciation of injury to the corporeal surface, felt. (Reynolds, *et al.*)

3. *Motorial Manifestations. (Early Stage).*—More or less severe *clonic* contractions of the muscles; heavy and unwilling motions; slight stertor, “even when the patient is awake.” (Reynolds.)

(*Later Stages*).—Voluntary movements mainly absent; sometimes to be provoked by excitation; continuance of clonic spasms; epileptic convulsions, more or less strongly marked. Dr. Reynolds (*op. cit.*) remarks that the rigidity of the muscles observed during this period varies greatly, being sometimes excessive, “and much increased by movement of the limb.”

4. *Mental Condition. (Early Stage).*—Listlessness; fretfulness; uneasiness; confusion of ideas, impairment of memory, or its entire loss; partial or complete, but light, delirium—noticed often during sleep, or “when falling asleep.” (Reynolds, Braun, *et al.*)

(*Later Stages*).—The profound insensibility of true coma, but at first capable of dispersion—the patient can, by persistent efforts, be aroused; soon, merging of this state into that of complete and irrecoverable carus. Frerichs notices the fact that the usually mild delirium which may, but does not uniformly, attend this state, is characterized by reiteration of the same word for a long time. A maniacal state may follow the coma, when that disappears.<sup>1</sup>

The species of coma first referred to—whilst the patient can yet be aroused—very much resembles that arising from opium, or other narcotic poisons, acting with full force. Dr. Reynolds, referring to this fact (*op. cit.*, p. 109), says he has noticed this sort of coma in the great majority of urinæmic cases he has observed. He writes:—

<sup>1</sup> See foot-note 1, page 20.—“Some cases of puerperal mania, accompanied by albuminuria, and where no eclamptic attacks had occurred, are alluded to by Dr. Simpson.”—Duncan (note to Braun, p. 136).

"The urinous element (whatever it may be) in the blood acts probably in a somewhat similar manner [*i. e.*, to that in which narcotics act]. There is not, however, in all cases of urinæmia, the notably contracted pupil that is observed in poisoning by opium. It is interesting to observe that the sensori-motor system appears to resemble, in its pathologic conditions, the spinal (or reflective) centre, rather than the cerebral (or intellectual). It is in a state of exalted rather than depressed activity, although both sensation and motion are severed from their purely cerebral relations (*i. e.*, from forming parts of perceptible and effective volition). There are several poisons which appear to act in a directly opposite manner upon cerebrum and spine (inducing at the same time coma and convulsions), but whether they contain different elements, whose action is thus separated, as Dr. Walshe once suggested, in a clinical lecture, the poison of urinæmia might be, I leave for future researches to decide."

5. *Special Functional and Organic Manifestations*.—In addition to the external appearances of the patient, as exhibiting deranged function of the skin, and perverted nutrition, the stomach and bowels may become excessively irritable. The vomited and other excreted matters, we are told by several observers, exhale ammonia when tested by hydrochloric acid; and the air expired from the lungs sometimes reacts similarly under the same agency (Frerichs, Johnson, Litzmann, Braun, *et al.*). The *pulse*, in the comatose state somewhat slow, rises, and is, at the same time, weak and irritable, in the convulsive periods.<sup>1</sup>

6. *State of the Urine*.—Confirmatory of the existence of obstruction to elimination and excretion. Depuratory processes at fault. The secretion is generally *acid* in reaction to tests, and *albuminous*—although cases of urinæmia occur in which albuminuria is not an element—casts of the *tubuli uriniferi*, and also blood-corpuscles and mucus-corpuscles are discovered by the microscope; and the urea is notably diminished in the specimens of urine passed. (Frerichs, Thudichum, Rees, Braun, Reynolds.)

A febrile condition, very similar to that of genuine typhus, is observed; and especially in connection with diminished excretion of the urine, or with its entire suppression. This is denominated by Frerichs, *febris urinosa*; the French writers designate it by the same term—"fièvre urinaire." There is delirium, excessive prostration, and a urinous odour pervading the excretions; and death is then imminent. Death may, in certain cases where the blood has been exceedingly impoverished and contaminated, follow epileptiform convulsions which are due simply to the deteriorated and devitalized blood. These convulsions should be distinguished from those arising from other causes. Sometimes, even in such cases, rupture of cerebral vessels may cause apoplectic coma, by effusion of blood.<sup>2</sup>

<sup>1</sup> It may be very much accelerated, and sometimes remains frequent throughout the affection.

<sup>2</sup> Drs. Watson, Todd, and George Johnson, have called attention pointedly to the fact of epileptiform convulsions springing from the circulation of impoverished blood in the cerebral vessels.

Should life be prolonged, and in cases where recovery is possible, and occurs, there may remain permanent injury to the general health; or special organs may be particularly acted upon. Hemiplegia, hemerolopia, amaurosis, and impaired mental vigour may be mentioned. Œdema of the lungs and serous effusion into the cavities are noticed—the cerebral ventricles, even, being invaded by an urea-bearing serum. Life is too frequently destroyed, however, to enable observers to enumerate many cases and facts bearing upon this portion of our subject.<sup>1</sup>

II. POST-MORTEM APPEARANCES.—It is universally conceded that very few structural changes, of consequence, and often *none whatever*, are found on necroscopic examination—after death from the mere action of uræmic poisoning—in the cerebro-spinal system. The apoplectic effusions and lacerations of the cerebral substance are only indirectly, if at all, referable to uræmia. The condition of this system is that which chiefly concerns us at this time; for we are seeking strictly for the effects, both vital and *post-mortem*, legitimately due to the toxic agent derived from the presence of urea in the blood. A full description, therefore, of what is found after death in the *kidneys*, does not seem to us pertinent to the question; for the usual and well-known renal lesions of Bright's disease are not the product, but simply the frequent cause, of the uræmic condition. We shall, therefore, endeavour to particularize the appearances presented after death by those organs which during life most strongly manifest the effects of the toxic agent, and with which it is most intimately brought into contact and relation—mentioning more succinctly such other concomitant lesions as have been observed. And in noticing the necroscopic phenomena in the cerebro-spinal system, we shall speak of such cases as have afforded the gravest indications of disturbance of the nervous centres during life, and especially decided coma and convulsions.

*Brain*.—Anæmic appearances, and a somewhat infiltrated condition, are noted; the consistence being most frequently diminished.<sup>2</sup> This state

<sup>1</sup> The *mania* which sometimes follows the comatose state in uræmic eclampsia, is generally well recovered from; but should not be confounded with that symptomatic of puerperal pyæmia.—Braun; who refers to Helm, Litzmann, "and others."

<sup>2</sup> Romberg (*Nervous Diseases of Man*, London, 1858, Syd. Soc. Ed.) when mentioning the results of cadaveric inspections in cases of *eclampsia parturientium*—which affection, it should be borne in mind, is now referred by such high authority to uræmic intoxication—says—rather adversely to what we find recorded by others—that in the cranial cavity we generally find considerable congestion, increased density of the cerebral tissue, plastic and sanguineous extravasations between the membranes, and in the ventricles, in the latter chiefly when apoplectic symptoms, a profound sopor, stertorous breathing, &c., have been associated with the convulsive affection." (*Loc. cit.*) The points in which this account chiefly differs from that given by Dr. Braun, are the frequency of congestion, and the increase

occurs irrespective of any abstraction of blood during life. The membranes of the brain are not commonly congested or "hyperæmic." Dr. Braun says, also, that inter-meningeal apoplexy is even more rarely observed than hyperæmia. He adds, that Helm and Kiwisch<sup>1</sup> very justly consider inter-meningeal apoplexy "as a secondary phenomenon produced by impeded circulation of the blood;" while it is looked upon by Litzmann as "a result of the uræmia."

*Spinal Cord.*—Examinations of the cord have been but infrequently made. (Romberg knew of *none* at the time of writing his *Treatise on Nervous Diseases*, the first edition of which was published in 1840 and the second in 1851.)

Braun states that Bluff, at one examination of the spinal cavity, "found much serum in it." Dr. Duncan reminds us, in this connection, that—as Dr. Christison first showed—the serum discovered in different regions of the body often has urea in it.

Dr. Todd, speaking of the condition of the cerebrum and spinal cord, after death following renal disease accompanied by coma and convulsions, says:—

"The organic disturbance of the brain which accompanies and causes the comatose tendency, is, as I have already remarked, much less than the pulmonary affection. There we find nothing which the most zealous morbid anatomist could call inflammation; and, except the patient may have died in convulsions, we do not even find congestion—that most fertile of causes with a school of pathologists which is, I hope, fast disappearing. Indeed the brain is generally anæmic," &c. \* \* \* (*Op. cit.*)

Dr. Simpson has reported (*Obstetric Works*, vol. i. p. 732) some cases of "puerperal convulsions connected with inflammation of the kidney," wherein effusion of blood and serum into the ventricles was discovered,

of the density of the cerebral substance, which the latter observer distinctly denies, as indeed do others. Romberg, whose whole description of the epileptiform convulsions of the parturient female is admirable, clear, and vivid, refers on the above points to Hauck (*Einiges aus dem Gebiete der praktischen Geburtshülfe*; in Casper's *Wochenschrift der gesammten Heilkunde*, 1833, vol. i. p. 133; and Velpeau, *Die Convulsionen der Schwangerschaft während und nach der Entbindung*. Uebersetzt von Bluff: Köln, 1835, p. 86). Romberg, as well as other authors, refers to the paucity of necroscopic facts connected with eclampsia puerperalis; and especially with regard to the spinal cord.\* This is, even at the present day, true; but the latest observations, coming as they do from reliable sources, must be allowed the greatest weight. With regard to the appearances in the brain, then, a certain difference of statement exists between Romberg and other authors we have consulted. As to the spinal cavity and the cord, there are no new facts within our cognizance.

<sup>1</sup> Helm, Th., *Med. Jahrbücher*. Wein, 1839, bd. xx. s. 202; Kiwisch, *Beiträge z. Geburtsk.* Würzburg, 1846.—Braun, *op. cit.*, chap. VI.

---

\* Never had been examined when Romberg wrote; but has been since.



with destruction of the right corpus striatum and outer portion of the optic thalamus, in one patient; together with encysted and degenerated kidney (*morbis Brightii*), and purulent-like matter, with adherent lymph, or false membrane, in another. In a third case, purulent-looking matter could be pressed out from the renal papillæ; no effused fibrin or coagulable lymph was discovered. The microscope did not decide the "whitish turbid fluid" to be pus—only epithelial cells, in large quantity, were found. The last patient had repeated convulsions, and died comatose, but no mention is made of any cerebro-spinal lesions being observed. The effusion of blood, and the laceration of cerebral substance in the first case related by Dr. Simpson, were truly apoplectic, and not referable to the intrinsic action of urea contained in the blood; although doubtless the amount present therein must have been considerable, since Bright's disease existed.

Dr. Watson (*op. supra cit.*, vol. i. p. 493), speaking of the appearances observed after death from apoplectic coma, after having referred to such a result from the action of retained urea, uses the following language:—

"On examining the brain, we may find a large quantity of extravasated *blood* spread over its surface, or lying within its broken substance; or a considerable effusion of *serous fluid* collected within its ventricles; or we may detect *no* deviation whatever from the healthy structure and natural appearance of the organ. The congestive pressure (if, indeed, it existed) has left no prints of its action."

The following observations, from the *Manual of Pathological Anatomy*, by Drs. Jones and Sieveking, are exceedingly apposite in this connection:—

"The researches of Bright, Frerichs, and others have demonstrated the close relation of the state of the blood to cerebral disease; and science has shown, what, previously, was purely hypothetical, that the most fatal conditions may be thus induced without any palpable changes being wrought in the cerebral tissues. It does not, however, follow, that because we see no changes, none have taken place. The poison that we know to be in the blood may elude our chemical tests, and yet cause death. Then, seeing how limited our knowledge of the nervous system is, it is not to be wondered at that, although the manifestation of altered function is so great as to force the belief in its altered constitution, it is not in our power to prove the latter to the perception; but, as Dr. Watson remarks, 'whatever may be the nature of the unknown, and, perhaps, fugitive physical conditions of the nervous centres, thus capable of disturbing, or abolishing their functions, it is useful to keep in our minds a distinct and clear conception of the fact, that there must be some such physical conditions.'"

Mere uræmia, therefore—presuming the occurrence of convulsions and coma—it would appear, leaves the brain anæmic in appearance, and possibly somewhat softened (more dense, according to Romberg; refer to page 20); the more decided and destructive appearances are owing to rupture of vessels, and consequent extravasation, with its consequences, and to dilatation of the ventricles with serum.

*Lungs.*—These organs are constantly found in an œdematous condition, and sometimes emphysematous. Dr. Braun, recording the fact that emphysema was long since observed by Böer, says that it is now considered “as always the secondary result of the fits”—i. e., uræmic convulsions. *Op. cit.*, p. 62.

*Heart.*—This organ is reported to be usually “empty and flaccid.” (*Braun.*) We may thence infer feebleness of circulation, and impairment of its own tonicity, and of that of the bloodvessels, by reason of the impoverished state of the blood, their natural stimulant.

*Kidneys.*—Generally, and according to some authors, always, the kidneys exhibit more or less extensive and advanced signs of Bright’s disease. In cases where the retention of urea in the blood has been caused by some other agency—such as obstruction, etc., there would naturally be traces of congestion, and perhaps of inflammation, although not uniformly; a nearly natural state might well enough exist.

As we previously intimated, it does not seem necessary to give, in this place, an elaborate account of the changes wrought by granular and fatty degeneration of the kidney, in connection with uræmia; and for reasons already stated. Moreover, these general appearances are well known, and abundantly set forth in many treatises. Those who would see, however, an admirable and somewhat condensed account of the changes of this nature effected in the renal tissue in urinæmic cases connected with pregnancy (*eclampsia puerperalis, seu gravidarum*), should consult the chapter of Dr. Braun’s work, to which we have so frequently referred. A few extracts only will be made by us, and those chiefly to call attention to certain prominent points in the renal necroscopic phenomena.

Dr. Braun bases his descriptions on the three forms of Bright’s disease proposed by Frerichs.

In the first stage, that of hyperæmia and commencing exudation, the surface of the kidney is smooth, the capsule is easily removed, the plexus of veins on the surface of the kidneys is dilated, and full of dark blood.” (*Loc. cit.*, p. 62.)

“The pyramidal masses [renal papillæ] are likewise hyperæmic, and their injection is striped. The mucous membrane of the pelves and infundibula is swollen, and covered with vascular arborescence; and they contain a bloody fluid. Apart from hyperæmia, the finer structures of the kidneys do not appear to be essentially injured. Hemorrhagic effusions are very frequently observed, which sometimes take their rise from the glomeruli; sometimes from the vascular plexus of the tubuli uriniferi, sometimes from the veins on the surface of the cortical substance.” (p. 63.) In the first stage, the epithelial lining of the uriniferous tubes is stated not to be essentially altered; the tubes themselves are often filled with exuded blood—“fibrin-cylinders.”

In the second, or exudative stage, fatty degeneration commences and pro-

gresses, the kidneys becoming large, and heavier than they are normally. The capsule of the kidney can be easily separated. The pyramidal masses are dark red. The infundibula have a dirty-red mucous surface. The glomeruli (vascular knots, Malpighian corpuscles), which may be drawn out with a curved pin, are covered with a fine granular matter, and partly with solitary or grouped fatty corpuscles, which, by the addition of acetic acid, become transparent.<sup>1</sup> Between the glomerulus and the capsule lies a thick stratum of firm exudation, of granular structure, and having fat droplets, and sometimes crystals of cholesterine.

The contents of the epithelial cells of the tubuli uriniferi next become degenerated—they are “decomposed in aggregations of granules.”

Fig. 1.



Malpighian Corpuscle, from the kidney of a patient who died of *Eclampsia Parturientium*.—(From Wedl's Pathological Histology, p. 280.) “The surface is covered, partly with a fine granular substance, partly with solitary and aggregated fat-globules, which were not further changed by acetic acid or carbonate of soda. \* \*”—(*Loc. cit.*)

In the third stage, that of retrogradation, atrophy of the kidney is progressively induced. The pyramids of Malpighi and Ferrein are observed to be less atrophied than the cortical layer. At their bases, granulations occur between the straight tubuli, and press the latter apart.

The width of the renal pelves is increased, and their lining mucous membrane swollen and covered with a network of “varicose vessels, of an uniform grayish-blue colour.”

“In those who die of uræmic eclampsia during pregnancy, atrophy of the kidneys is less frequently observed than the first two stages of Bright's disease.” (*Op. cit.*, p. 69.)

III. URÆMIA IN CONNECTION WITH PREGNANCY AND PARTURITION.—If we receive the opinions of certain modern pathologists as true, the retention of urea in the blood of the pregnant female is productive, both to herself

<sup>1</sup> Wedl mentions that acetic acid rendered the fat-globules more distinct.

and to the fœtus, of the most disastrous results. The views of Dr. Braun, already referred to, have been adopted by a large number of able and practical men in our profession; and, since the publication of his volume—and mainly, in Great Britain and this country, through Dr. Duncan's translation of the chapter on uræmic eclampsia—have elicited great attention, and will doubtless prove an incitement to yet more extended and close observation.

Whilst many have joined Dr. Braun in this new theory, there were at the time his work appeared, and probably still are, several distinguished names arrayed against it. These are all mentioned by the author himself, who also states the objections made by them, and gives what he considers the refutations thereof. Dr. Braun's belief, as declared in his treatise, is simply this: *that the convulsions caused by uræmic intoxication in acute Bright's disease, and puerperal eclampsia, are identical.* This proposition, as he tells us, has been energetically defended by Frerichs, Litzmann, Wieger, Oppolzer, himself, and many others; but it has been assailed by Marchal, Siebert, Depaul, Legroux, L'Huillier, Stoltz, Seyfert, Levy, in very valuable articles, and also by Scanzoni. With much anxiety these observers have tried to prove that the Brightian degenerations of the kidneys, which, it cannot be denied, are found in the bodies of those who have died of eclampsia, are consequences merely of the convulsions—only accidental, secondary phenomena of the hyperæmia caused by the eclampsia, and of hydræmia (*plethora serosa*).

Scanzoni, whose arguments against Dr. Braun's views are summed up and given by the latter author, refers the true *eclampsia parturientium* to an "irritability of the motor system of nerves which has been induced by pregnancy, and increased by the act of delivery."

The arguments *pro* and *con* have been actively carried on; and Scanzoni's conclusions were replied to by Wieger in June, 1854, and by Litzmann in 1855. In addition, the industry and zeal of Dr. Braun have enabled him to collect a truly imposing array of facts from *post-mortem* observations made by himself and other reliable practitioners, and in the majority of which abundant evidence of Brightian renal lesions existed. In some of the cases, where hyperæmia of the kidneys was found, microscopical examination was prevented by "accidental obstacles;" but the author does not consider this "any proof of the absence of Bright's renal exudation." Dr. Braun, while setting forth these investigations, says that Wedl<sup>1</sup> explains the non-discovery of fatty degeneration in the kidneys in several instances of death from eclampsia, "by the fact that in many cases a dissolution of the Malpighian bodies is effected by the fluid exudation, and hence in every diffuse inflammation of the kidneys an evident fat-metamorphosis of the contents of the Malpighian capsules does not ensue."<sup>2</sup>

<sup>1</sup> Grundzüge der pathol. Histologie, Wien, 1854, S. 306.

<sup>2</sup> Loc. cit., pp. 74, 75.

Hasse, according to Dr. Braun, has never seen eclampsia puerperalis without Bright's disease. The necroscopic and microscopic observations of Wedl, Gustav Braun, Lumpe, Hecker, Devilliers, Regnaud, Simpson, Blot, Cahen, Wieger, Litzmann, Credè, Sabatier, and Hohl have contributed to establish the theory propounded in Dr. Braun's volume.

In reference to the *etiology* of "eclampsia parturientium" ("uræmic eclampsia" of Braun), Romberg<sup>1</sup> only hints at the agency which Braun has distinctly announced as, in his opinion, the chief efficient cause. Thus, while the latter ably demonstrates his views as to the retention of urea, and the accompanying albuminuria, the former refers to "retention of urine owing to pressure of the gravid uterus upon the bladder;" and afterwards adds: "Future investigations must determine whether albuminuria, which often supervenes during pregnancy, may, when fully developed during the last months, possess any etiological influence." The "investigations" of Braun and others certainly seem, if not already to have determined this point, likely to lead shortly to a satisfactory settlement of the whole question.

Supposing, then, in conformity with the new doctrines thus announced, that the convulsive attacks and intervening coma observed in puerperal patients are owing to toxæmia by retained urea, let us examine the collateral results of such a condition—first, in regard to the mother; and next, as respects the foetus. Having already detailed the general effects produced upon the system by uræmic intoxication, we may properly direct our notice, at present, to the influence exerted upon the *puerperal state*, and upon the *life* of the mother and that of the foetus.

Referring to our previous enumeration of the results, both vital and *post-mortem*, which are observed after genuine uræmic convulsions, we would only add thereto that the *uterus and its appendages* are generally found healthy after eclampsia puerperalis, or, at all events, do not necessarily deviate from their usual condition after labour has terminated; unless, of course, there has been some pre-existent or concomitant disease in, or alteration of, the organs. The infrequency of metritis and peritonitis is mentioned by some observers;<sup>2</sup> but Churchill<sup>3</sup> speaks of the great tendency to abdominal inflammation after the labour is over, and quotes Denman, who first mentioned this, and Collins and others, as confirming it. Braun also refers to the danger of puerperal affections coming on after eclampsia, especially if "an epidemic of zymotic diseases prevails."

The *spleen* is said to exhibit "the large dimensions it possesses in pregnancy and childbed."<sup>4</sup>

<sup>1</sup> A Manual of the Nervous Diseases of Man; Sydenham Society's edition, London, 1853, vol. ii. p. 189.

<sup>2</sup> Romberg, Velpeau, *et al.*

<sup>3</sup> Theory and Practice of Midwifery.

<sup>4</sup> Braun, *op. cit.*, p. 62.

We now proceed to the consideration of the special influences exercised by uræmic intoxication during the puerperal state.

1. *Influence of Uræmic Eclampsia on the Duration of Pregnancy.*—Uræmic eclampsia is generally sudden in its accession, prompt in its results; and the testimony of those who have had the most experience in regard to it, is that it either causes death rapidly, or else that it is completely and with considerable celerity recovered from. Long consequent illness and sequelæ, *from the eclamptic state merely*, are not common. The true uræmic eclampsia occurs in the majority of cases in the latter part of the period of pregnancy. It may, also, only appear at the time of the labour itself; after the child is born, and before the after-birth has been delivered; or, finally, during child-bed. When supervening within the latter half of utero-gestation, premature labour is the result—as a rule.<sup>1</sup>

The latter two months of pregnancy are stated to be peculiarly obnoxious to the occurrence of convulsions. (Churchill, Romberg.) The *cause* of premature labour is either excitation of uterine contractions by the power of the abnormal action going on in the nervous centres,<sup>2</sup> or it may be, partially at least, ascribed to the presence of a dead fœtus, whose destruction is referable to the eclamptic condition. Ramsbotham, we observe, does not think the latter occurrence a cause. Churchill queries whether it may not be such; and the supposition is at least plausible. Dr. Copland (*Dict. of Med.*) speaks of cases where “the child has been unexpectedly born during the violence of the convulsions, as if expelled by them with unwonted celerity.” Again, he states that the worst forms of the attack are often attended by a firm, spasmodic constriction of the cervix uteri, preventing the expulsion of the fœtus.

2. *Influence of Uræmic Eclampsia upon the Life of the Mother.*—Although puerperal convulsions—we here use the term, let it be remembered, as synonymous with uræmic eclampsia—are comparatively a rare affection, yet they make up for the element of infrequency of occurrence, by violence of manifestation and an alarming ratio of fatality. As the liability to an attack is greater towards the last of the period of utero-gestation, so, generally speaking, is the danger to the life, both of mother and child, at that time. Not only is this true if we merely refer the eclamptic condition to the increased sources of irritability to which the nervous system has

<sup>1</sup> It is well known that Bright's disease, without any other influence, will cause premature labour; Braun says this is true in about 25 per cent. of cases. Add *convulsions*, and the danger is manifestly increased.

<sup>2</sup> Blundell (*Principles and Practice of Midwifery*, Am. edit., p. 418), referring to this point, says: “Sooner or later, \* \* if the fit continue, parturition commences of itself, without the interference of the accoucheur; and \* \* a sudden emersion of the fœtus occurs.” He also refers to the occurrence of delivery during convulsions, unknown to the attendants.

become liable, by reason of the pregnant state and its advanced stage; but also it is easy to see that a poisoned blood is all the more likely to act with increased morbid force—especially upon foetal life. Again, the danger from convulsions diminishes according as they approximate to the term of delivery; and we are told, by a most competent authority, that the fits diminish in force in 31 *per cent.* of the cases, cease entirely in 37 *per cent.*, and only continue of the same intensity in 32 *per cent.*, *after the uterus is evacuated.* (Braun.)

Dr. Braun refers to 15 deaths out of 45 cases, of which he has published accounts—being exactly *one-third*. He speaks of nine cases occurring in his practice within the last three years, all of which terminated in recovery. Thirty *per cent.* of the cases, it is estimated, prove fatal. Romberg gives a higher ratio of mortality. His statement is, that above one-half of the women attacked, died within twelve, twenty-four, or thirty-six hours. Churchill finds from his statistical investigations, that the proportion of fatal cases is above one-fourth. He intimates that there has been a tendency, of late, to diminution in the mortality-rate, which, at one time, he asserts, was very much larger. It has not been thought that much, if any difference as to fatality can be ascribed to early or late supervention of the affection; at all events, lateness of attack has not been allowed more weight, in this respect, by observers, when it is a first case. Some patients have several attacks in successive pregnancies, and finally die in one. A reiteration, therefore, of the accident, must be deemed of unfavourable augury. The concomitance of coma, with apoplectic stertor, and the approximation of the fits, so that they become, as is sometimes the case, almost continuous—and especially when these conditions obtain in plethoric and strongly constituted patients—are, almost without exception, fatal elements.

Recovery from the mere eclampsia may take place; and there may be some extensive dropsical effusion, some injury to the brain or spinal cord, or a permanent and increasing œdema of the lungs, disease of the heart, etc., which will compromise life at a later period; but, as a rule, if the patient escape the eclampsia, and its *immediate* results, recovery is usually not tardy, and, moreover, is complete. The occurrence of rupture of the uterus, in itself sufficiently grave at any time, we need scarcely say, very greatly aggravates the unfavourable prognosis attaching to eclampsia. Dr. Copland remarks (*Dict. of Practical Medicine*), that puerperal convulsions “should never be considered devoid of danger, more especially when they occur after delivery, or in consequence of great exhaustion of vital power, or of uterine hemorrhage. When they are slight, are unattended by stertorous breathing, or by paralytic or apoplectic symptoms, and when parturition is so far advanced as to readily admit of its completion by art, less danger may be feared.”

The balance of prognostic opinion, it will be seen, is against recovery; and Blundell speaks of *post-partum* convulsions as being the most dangerous.

3. *Influence of Eclampsia on the Life of the Fœtus.*—We have already intimated the danger arising from eclampsia parturientium to the life of the fœtus. Relatively, it is even greater than that threatening the mother. In referring to this point, those who have had the largest experience, use such expressions as the following: "In almost all cases the child is still-born, often putrid." (Churchill, *op. cit.*) "The life of the fœtus is endangered so long as it is nourished by the uræmic blood of the mother." (Braun, *op. cit.*) "The infant almost invariably dies when the disease occurs during the last months of pregnancy; it may be saved when the eclampsia supervenes during parturition." (Romberg, *op. cit.*, p. 189.) "The infant is generally, though by no means universally, born dead, when the woman has been the subject of convulsive seizures, especially if the attack has occurred early in the labour, and continued for any length of time." (F. H. Ramsbotham, *Principles of Obstetric Medicine and Surgery.*) The latter author pointedly and happily refers to *toxæmic action* on the blood of the fœtus as the most likely cause of its death *in utero*; and mentions a case from Spence, where the child being removed alive by Cæsarean section from a mother just dead from convulsions, died itself, in convulsive paroxysms, in less than an hour. The latter statement leaves us to presume a poisoned condition of the blood. M. Ménard states, that, in the majority of cases of death by convulsions, previous to delivery, the child has been found dead; the contraction of the features and extremities showing that it had participated in the affection of the mother. Dr. Copland, who notes this remark (*Dict. of Med.*), says that it "wants confirmation."

We thus see that the likelihood of the life of the fœtus being maintained after eclampsia has been declared in the mother, is extremely small, as might, indeed, be expected; and if the child be born alive, there is great probability that it may either not survive long, or that it will be more or less morbidly affected by the accidents occurring during its intra-uterine existence.

Hereditary transmission of eclampsia, uræmia, or Bright's disease of the kidney, to a suckling, says Dr. Braun, "has not yet been demonstrated, and only Simpson has found albuminuria in a suckling born of an eclamptic mother." Dr. Duncan, in a foot-note to the paragraph from part of which the last remark is taken, says that "if the uræmia persists in a nursing woman, urea may be present in the milk, as has been shown by several observers, and may disturb the health of the suckling."



URIC ACID.—(Symbol:  $\overline{U}$ . Formula:  $C_5H_4N_2O_6 + HO$ )<sup>1</sup>

*Synonyms*.—Lithic acid; Urylic acid.—PROUT, BIRD, *et al*.

This substance is the next constituent of the urine, in the order of enumeration we follow; and the effects of its retention in the blood will therefore now engage our attention.

It is recognized as a constant ingredient of healthy urine, and holds a very intimate relation to urea. (Thudichum, *op. cit.*) "It forms less than  $\frac{1}{1000}$  part of the urine in man; but its proportion varies much in different animals." (Dr. George Johnson, *op. cit.*, p. 50.) In the blood, it is always found in union with an alkaline base; and it is not soluble in that liquid. It appears in the blood in the form of urate of soda, or of urate of ammonia. (Liebig, Simon, Thudichum.) Dr. Thudichum states that the urates are always acid salts—*i. e.*, that there is excess of uric acid—and he has advanced some ingenious reasons for denying the accuracy of Dr. Golding Bird's theory and explanation of the secretion of uric acid in the form of urates. With this chemical discussion we have no concern; the indication of the pathological states induced by retention of the acid in the blood, in the form above specified, being now our object. Before approaching the subject in detail, however, it does not seem particularly out of place to allude to a practical remark by Dr. Thudichum (*op. cit.*, p. 100) upon the deposition of the urates from the urine. Researches and observations in reference to this point, cannot fail to be of importance in the treatment of such cases. Dr. Thudichum says:—

"If the presence of a deposit of urates be taken as an indication of the saturation of urine by these salts, and if the latter be assumed ordinarily to be of the usual amount, deposits of that kind become more valuable as signs of a diminished secretion of water by the kidneys than of any other symptom. As the appearance of a deposit of urates is always accompanied by morbid sensations and objective symptoms—in the healthy by thirst at least, if by nothing more—the conclusion is simple enough. *The individual whose urine has deposited the urates does not drink water enough, and must drink more, and must drink so much that the urine, at the ordinary temperature of the air, shall remain clear.* Of course, in some cases this will be neither possible or advisable; but in most cases of acute and febrile disease it should be a plan of treatment. I have certainly seen it attended by beneficial results in many cases; I have also observed the contrary—want of water in the system—to be a source of disease."

<sup>1</sup> Thudichum.

*Chemical Composition of Uric Acid.*

THUDICHUM.		G. BIRD.
Carbon	. . . 35.714	$C_{10}N_4H_4O_6, C_2H_4N_2O_2 + 2C_4NO_2 = 168$
Hydrogen	. . . 1.191	
Nitrogen	. . . 33.333	
Oxygen	. . . 19.048	
Water.	. . . 10.714	
	<hr/> 100.000	

GOUT.—Whenever, from failure to eliminate the uric acid from the blood, that substance accumulates therein, the abnormal effects of its presence do not long delay their manifestation.<sup>1</sup> It is well known that the ingestion of large quantities of highly-azotized food, and a rich diet generally, together with the free use of malt liquors and of acid wines—Madeira amongst others—is productive of an abnormal increase of uric acid in the system; and, consequently, luxurious livers have long constituted the majority of sufferers from gout—a malady which abundantly declares its *fons et origo*, by the tendency to abundant deposition of the *urate of soda* in different parts of the body; its seat of election being the smaller joints—as those of the toes and fingers. In the latter, the deposit is often very plentiful. We have seen not long since—and the occurrence may not be very uncommon—a patient who could write his name with his “chalk-stone” knuckles; a woful example, truly, of diverted and arrested excretion!<sup>2</sup>

As has been previously mentioned, Dr. Garrod, of London, first called attention, not only to the presence of uric acid in healthy human blood, but also pointed out the fact of its abnormal amount in connection with gout. He did not, however, then wish to be distinctly understood as declaring the acid the sole *materies morbi* in that disease, as may be seen by his remarks in a “Postscript” to his highly interesting paper, communicated to the Medico-Chirurgical Society, upon the subject. This important contribution to scientific medicine was read before the Society,<sup>3</sup> February 8, 1848, and the postscript just alluded to bears date July 26, 1848. (Vide *Medico-Chirurgical Transactions*, vol. xxxi.)

Daily observation tends to show that the relation of cause and effect may more and more safely be predicated in regard to the presence of an excess

<sup>1</sup> Bernard recognizes the accumulation of uric acid in the blood, either by arrest of the renal function, causing its elimination to cease, or by an exaggerated production of it, as in gout. (*Liquides de l'Organisme*.)

<sup>2</sup> An instance of this is related by Dr. Watson (*op. cit.*), and Dr. Todd has alluded to the condition. After all, cases of this extreme nature may not be so common as we have intimated.

Dr. Garrod (*On the Treatment of Gout and Rheumatic Gout*) remarks upon this point: “Comparatively few gouty patients become the subjects of visible chalk-stones, at least to any extent, or such as to induce deformity; at the same time, I am convinced that their occurrence in a slight degree is by no means so rare as has been generally assumed. Sir C. Scudamore stated, that in 500 cases of gout he only found them 45 times, or in less than 10 per cent. From my own experience, I consider these numbers far below the real proportion, being confident that their existence is frequently overlooked, as they are sometimes deposited in parts of the body scarcely to be expected.” Dr. Garrod thinks that gouty concretions are more frequent upon the cartilages of the ear than anywhere else; contrary to what has usually been recorded. He refers to the *Medico-Chirurgical Transactions*, vol. xxxvii., 1845, pp. 74, 75.

<sup>3</sup> By Dr. C. J. B. Williams, upon some of whose patients Dr. Garrod's experiments were made.

of uric acid in the blood and the phenomena of gout. Writers upon the subject, both near the time of Dr. Garrod's first researches, and later, have varied somewhat as to the completeness with which they have expressed themselves in respect to establishing uric acid as the active agency in gout. The majority of testimony seems to be affirmative. Dr. Watson (*Principles and Practice of Medicine*, 1848) seems to have then regarded the morbid agent as recognized. We find, indeed, in the edition of Dr. Carpenter's *Physiology* published in 1846, very positive language as to the conspicuousness of uric acid in gouty affections; he says: "When it [uric acid] is imperfectly eliminated, we are assured of its accumulation in the circulating fluid, by its deposition, in combination with soda, in the neighbourhood of the joints—forming gouty concretions, or chalk-stones." He thus appeared to recognize the cause of the diseased condition as lithic acid. There are those, however, who, even at the present day, speak with less distinctness as to an excess of uric acid being the sole and sufficient *materies morbi*. Thus, Dr. Barclay (*A Manual of Medical Diagnosis*, London, 1857) writes: "The researches of recent times have gradually led to the discovery of an important element in gout—the presence of an excess of uric acid in the blood. This knowledge holds out a prospect of our arriving ultimately at more accurate diagnosis; at present, it is only in the hands of a few that such a chemical test can be relied on." The opinion is a very guarded one—decidedly non-committal; we think more influence than it implies may safely be allowed to the "element" in question.

It will, at least, not be disputed that gout is a blood-disease. Amongst many other observers who might be cited on this point, we select Dr. George Johnson, as furnishing comprehensive testimony. Referring to gout as a cause of renal disease, he says: "It would be useless to occupy the time of my readers by lengthened arguments to prove that gout is a blood-disease, since all the phenomena of the disease clearly indicate such an origin, and can be explained on no other supposition." (*Op. cit.*, p. 78.) He then alludes to the intimate connection between gout and the uric acid diathesis. Thus, then, when such a diathesis prevails, or when, by some obstructing agency, the elements of the urinary secretion are retained and accumulate in the blood, the gouty accidents, amongst others, prevail. If uric acid be prominent, the corresponding series of symptoms seems as sure to occur, as does that following the retention of urea when *that* substance is retained, in excess, in the circulation.<sup>1</sup> If the uric acid, therefore, is received as the true *materies morbi* in gout, we have, at once, the following easily-deduced sequence of morbid effects:—

First, deficient depuratory action; next, accumulation of uric acid in

<sup>1</sup> The blood contains, as Dr. Garrod remarks, "mere traces" of uric acid *in health*. This fact, however, in no degree invalidates the agency of the acid as a *causative element in gout*.

the blood; *dyscrasia*, chemical and physiological; deposition of urate of soda in various parts; the objective phenomena of gout; the *sequelæ* of gout—amongst others, as Dr. Johnson points out, renal disease. Under the light of modern pathology, we do not think the above any too weighty a burden to lay to the charge of retention and accumulation of uric acid in the blood.

There may remain a certain quantity of uric acid in the urine, at the same time that the analysis of the blood shows an abnormal amount therein. This would indicate a large supply from some source—either from waste of the tissues, or from the excessive ingestion of highly-azotized food, to which latter cause we some time since alluded. Dr. Copland notices, in a comprehensive and satisfactory manner, the "Pathological Relations of Uric Acid and Urate of Ammonia" (*Dict. of Pract. Med.*); and M. Becquerel (*Séméiotique des Urines*) agrees with him in his views. Copland, referring to this, considers the chemical explanations offered by Liebig, in connection with certain of these pathological points, "opposed to clinical observation."<sup>1</sup>

Dyspepsia, with mal-assimilation of food and consequent deficient nutrition, or arrested cutaneous function and habitual costiveness, no less than obstructed excretion of the urine, may engender an excess of uric acid, and the latter may be retained in the blood. (Copland, *loc. cit.*; Chambers, *Digestion and its Derangements; et al.*) It is likewise true, conversely, that in depraved, deteriorated, and anæmiated states of the circulation, uric acid is diminished in the urine. If this ill-adjusted balance implies the throwing of an unusual quantity of the substance into the blood, the latter circumstance may have no small amount of influence, if not in causing, at least in continuing, the disorder of the blood itself and of the constitution generally. Gout occurring under such circumstances—as it is not very infrequently known to do—would be appropriately termed *atonic gout*, or what Dr. Todd (*Clinical Lectures*) terms "*asthenic gout*," in contradistinction to his "*sthenic gout*," where the affection occurs in robust, well-constituted, and richly-nourished individuals.<sup>2</sup>

In reference to the dyspeptic condition of gouty patients, often so exceedingly troublesome, Dr. Chambers (*op. cit.*, American edition, 1856, pp. 294–95) refers rather scornfully to the influence of uric acid as a noxious element. He is remarking upon the tendency of the food to become acid after ingestion, and to lie unchymified—not "passing onwards." This

<sup>1</sup> Dr. Copland does not believe that the presence of urate of soda in the blood of gouty patients precludes "the elaboration of a portion of the uric acid and its compounds, or the modification and metamorphosis of one or more of their elements by the kidneys." (*Dict.*)

<sup>2</sup> These two forms of gout, we conclude, are those termed by Dr. Druitt "*high*" and "*low*" gout. (*The Surgeon's Vade Mecum*, 1859.)

state of things, so common in hereditarily gouty persons, Dr. Chambers is inclined to explain by considering its pathology "to be a slight flux of mucus, deficient gastric secretion, and yet a vigorous, sometimes even excessive appetite. Hence, they have not that check of failing desire for food which makes the meals of other invalids moderate, and eat more than their imperfect gastric juice can digest. This is a simpler, and, therefore, more probable explanation than the usual chemical talk about uric acid, &c., which might be substituted for it." It seems there is some fault in the working of the hidden *chemistry* of the body, however; and, although Dr. Chambers's explanation is doubtless very correct in reference to the influences and agencies of which he speaks, yet the overt action and manifestations of excess of uric acid, in the visible form of urate of soda concretions, sufficiently show the importance of the part it plays in the *tout ensemble* of gouty affections.

The original conclusions of Dr. Garrod, given in the admirable paper to which we have referred, were these:—

"1st. The blood in gout contains *uric acid* in the form of urate of soda, which salt can be obtained from it in a crystalline state.

"2d. The uric acid is diminished in the urine immediately before the gouty paroxysm.

"3d. In patients subject to chronic gout with tophaceous deposits, the uric acid is always present in the blood and deficient in the urine, both absolutely and relatively to the other organic matters, and the chalk-like deposits appear to depend on an action in and around the joints, &c., vicarious of the 'uric-acid-excreting' function of the kidneys.

"4th. The blood in gout sometimes yields a small portion of urea (no albumen being present in the urine)."

These conclusions were all duly sustained by analyses and experiments upon patients in University College Hospital; and the record of these demonstrations is at once satisfactory and highly interesting.

In respect to the supervention of gout in low and debilitated states of the system, to which allusion has previously been made, Dr. Garrod very clearly explains "two facts" then considered opposed to referring the pathology of gout to the humoral doctrines. We may say, *en passant*, that the humoral pathology seems the only reasonable mode of explaining the affection, and that, as may be distinctly perceived, it is coming more into favour of late, than it has been for a long time, in respect to many diseased conditions.

Dr. Garrod's remarks on the above point are:—

"Any undue *formation* of this compound (urate of soda) would favour the occurrence of the disease; and hence the connection between gout and uric-acid gravel and calculi; and hence the influence of high living, wine, porter, want of exercise, &c., in inducing it." Then, speaking of the "two facts"—viz., *hereditariness* and the supervention of gout in *low states* of the system—he says:

"We can understand that the peculiarity of the kidney, with reference to the excretion of uric acid, may be transmitted; and likewise that, when the function in question is permanently injured [viz., the 'uric-acid-excreting' function], it will not require an excessive formation of the acid to cause its accumulation in the blood." (*Loc. cit.*, pp. 93, 94.)

Dr. C. J. B. Williams (*Principles of Medicine*), referring to the fact that gout had been generally admitted, by inference, to depend on the existence of an excess of uric acid in the system, chronicles Dr. Garrod's experiments and analyses, which, as we have stated, were first made on patients under Dr. W.'s care, in hospital. He says:—

"Gout, and the commonest kind of urinary gravel are now generally considered to depend on the production in the system of an excess of lithic acid." (*Loc. cit.*) The case from experiments upon which Dr. Garrod was first enabled to draw his reliable conclusions, "was one of chronic gout; and further illustrated the pathology of the disease, by a total absence of lithic acid in the urine, until during the exhibition of colchicum, when its characteristic crystals appeared under the microscope."

Sufficient testimony, it would appear, has been adduced, to render the position tenable which ascribes the gouty paroxysm to an excess of lithic acid, circulating in the blood, and finally deposited in various parts of the body.<sup>1</sup> It does not seem to devolve upon us to describe the phenomena of a fit of the gout—expected as we are, merely to signalize the "effects" of retention of the various elements of the urinary secretion in the blood, we should strictly confine ourselves to such specification, and to the adduction of the best evidence afforded in its support.

In the first place, then, we may refer the phenomena of gout, more or less completely, to that disorder of the eliminating function of the kidneys, which permits the latter organs to refuse the excretion of uric acid. The latter substance is then necessarily thrown into the circulation, and its tendency—under the circumstances—is to accumulation in the blood. As it accumulates, it is converted, most commonly, into urate of soda, and the deposition of the latter substance upon and into various tissues of the body is a *quasi* vicarious discharge of the uric acid, not excreted by its legitimate channels, the kidneys. This condition is accompanied by the objective phenomena of gout, viz., pain, of an exquisitely acute and torturing character; feverishness, dyspeptic symptoms, and general *malaise*;<sup>2</sup> at the close of the paroxysm, tense, shining, and often excessive swelling of the affected part; finally, entire remission of the symptoms, and better health than before the attack—owing, of course, to the elimination of the *mate-*

<sup>1</sup> See Appendix, Note B.

<sup>2</sup> "An impure state of the blood, arising principally from the presence of urate of soda, is the probable cause of the disturbances which not unfrequently precede the seizure, and of many of the anomalous symptoms to which gouty subjects are liable." (A. B. Garrod, *op. cit.*, p. 341.)

*ries morbi.* The subsequent course of things will depend very materially upon the habits of the patient, and upon the power he has of restraining his appetites; the fact of hereditary predisposition, or the contrary; and whether the management of the initial attack is judicious, or otherwise. By renewed attacks—chronic gout—the system of course becomes more shattered, less capable of resistance, and less amenable, too often, to remedies. Locally, a variable, often an excessive, amount of injury supervenes. It is at these periods that the lithate of soda—the morbid material—is deposited in various places—principally about the smaller joints. Nature, in her efforts to eliminate this material by other channels than those which are the legitimate ones, does the best she can, but often terribly cripples the subjects of this trying affection (see Fig. 2). Connected with this chronic form of the complaint, we are apt to notice the most troublesome combinations of dyspeptic ailments; and in these the condition of the patient becomes the most unpromising possible, both from the local and from the systemic difficulty. As Dr. Williams states, the uric acid, in such cases, “seems to be engendered in great abundance, and although thrown off in large quantities in the urine for an indefinite period, yet never leaves the body free. Such cases are commonly either hereditary, or those which have been rendered inveterate by intemperate habits, or neglect of proper treatment.” (*Op. cit.*)

Fig. 2.



Elbow and Hand deformed by Gouty Enlargements.—From Dr. Garrod's work (*Nature and Treatment of Gout.*)

*Sequelæ of Gout.*—Considering gout as one of the affections ascribable to the retention of uric acid in the blood, let us inquire what are the principal subsequent results. These may, of course, be properly referred to the same cause, as “morbid effects.”

We have seen that symptoms of general febrile disturbance, which are of course accompanied by nervous apprehension, fretfulness, heat of skin,

more or less sleeplessness, and scanty urine—and which at last is loaded with the lithates, whenever the paroxysm of gout comes on, and at its decline, especially—with hypochondriacism, cramps, flatulence, diarrhœa, but more commonly costiveness (Watson), and more or less general and indescribable *malaise*, both precede and accompany gouty attacks. The dyspeptic symptoms may long remain; although, with care, they may be made sooner or later to disappear.

One of the most serious sequelæ of gout may be considered that wherein the kidneys are affected. Perhaps we may best describe the state we wish to indicate, by terming it the result of a sort of *recoil* upon the kidneys, of the antecedent morbid action in the economy. This is of course entirely the opposite condition of that obtaining when the kidneys fail to eliminate the uric acid, *i. e.*, when their “uric-acid-excreting function” is suspended. In the latter condition of things, we have the blood-disease, the results of which we have sketched above; but when the uric acid begins again to be excreted by its natural passages, the kidneys are very likely to be more or less irritated in the process. There may then be violent pain (*nephralgia*), and nephritis or true inflammation of the substance of the organs may occur. Fully as unfortunate is that state when there is such an amount of uric acid as to be thrown down from the fluid part of the urine—the latter not being sufficient to hold it in solution, and thus carry it out of the body—when it is exceedingly apt to become concreted in various parts of the urinary passages—thus producing obstructions more or less seriously endangering health, and vitiating, in different degrees, the integrity and usefulness of the organs involved. Permanent irritation may thus be maintained; or serious and fatal inflammation be set up; and concretions may be found in the urinary bladder, which will call for surgical interference for their removal.

Dr. Williams (*op. cit.*), referring to the renal irritation frequently caused in these cases (p. 130, American edition, foot-note), says: “I have in several instances found in the cortical and tubular structure of the kidney, clustered crystals of lithic acid, which, under the microscope, exhibited such sharp angles and dagger-shaped projections, as would afford an easy explanation of the pain, inflammation, and hemorrhage, often attendant on an attack of renal gravel, even when none is obvious in the urine.” The same writer reminds us (p. 187), of “the proximity in composition between lithic acid and urea,” and that it is probable, according to Liebig, that the former may be converted into the latter. He likewise calls attention to the fact that both gout and rheumatism may give rise to fluxes and catarrhal affections, as oliguria does. Rheumatism and Bright’s disease are also, often, nearly related. In respect to this fact, Dr. Garrod announced the following opinions and conclusions, in his paper already quoted (*Med.-Chir. Transactions*, vol. xxxi.), “Blood from patients suffering from Bright’s



disease and albuminuria after scarlatina, was then examined; the results of these analyses appear to show that—

“1st. Uric acid is always present in the blood in albuminuria. The quantity, however, greatly varies: when the functions of the kidneys are much impaired, it exists in quantities almost as great as in gout; in other cases its amount is small, but it usually exceeds that found in ordinary blood.

“2d. Urea always exists in large quantities in this blood (a fact which has been long since proved), and no relation is found between the amounts of urea and uric acid.

“3d. The kidneys are always deficient in their power of throwing off urea; but with regard to the uric acid, their excreting function may be impaired or not.” (*Loc. cit.*)

We thus see what serious disturbances may arise in the system by a perverted condition of secretion, arrest of excretion, and attempts at vicarious elimination of a product which must, in order to the preservation of health, be discharged from the body. The diseases thus produced come clearly under the head of *disordered vital chemistry*. Thus, when the above vital functions are weakened, or totally disabled, there must be not only general disturbance, but, after a time, some special manifestation of disease, and the results of vitiated secretion, decomposition, and over-worked and irritated organs.

The *contracted kidney*—called, by the late Dr. Todd, “the gouty kidney”—and which, as the term he has given it implies, he considered due to the effects, at once irritant, inflammatory, and destructive, arising from gout, we may mention as a result primarily dependent on disorder of the “uric-acid-excreting” function. Dr. Todd has given satisfactory proof (*Clinical Lectures on Certain Diseases of the Urinary Organs*) from cases of patients, of the existence of this form of renal disease. He mentions, also, that many might be inclined to refer it to advanced Bright’s disease; but he has signalized it in those who he believes never had that affection. The kidney is shrunken, “and its structure condensed—a condition which, while it may also occur in other states of the system, is peculiarly apt to be developed in the inveterate gouty diathesis.” (*Loc. cit.*, p. 313.) In one case, necroscopy disclosed hypertrophy of the heart with dilatation—partly due to incrustations on the mitral valve—hardened, condensed, and somewhat contracted liver—the Glissonian capsule being hardened and thickened. The morbid alteration in the latter organ is explained partly by the intemperate habits to which the patient was addicted, “but partly likewise by the share which the liver had in the elimination of the morbid poison of gout.” This latter result, which is not infrequent, it

<sup>1</sup> A term objected to by Dr. Barclay (*op. sup. cit.*); who, however, very distinctly recognizes the close connection between gout and renal disease. Valleix, writing in 1853, would not admit that special form of nephritis which is referred to the gouty diathesis.

is important to notice, as one of the secondary effects of the diverted and retained urinary element. The kidneys in this patient were very much contracted, being hardly one-third of their natural size; they were granular and shrivelled upon their surfaces; the investing capsule was apparently denser and whiter than usual, and was easily detached from the glandular surface. Diminution of the cortical renal substance was the source of the decrease in the size of the organ; two-thirds being estimated to have disappeared. The granulations were noticed likewise upon the cut surface. Dilated and scantily-lined *tubuli uriniferi* were observed on microscopic inspection; from some of them all the epithelial lining had vanished; others were collapsed, folded, and crumpled up; and looked like "fascicles of fibrous tissue." A few fatty-epithelial cells were detected in certain *tubuli*; and others of the latter were seemingly healthy, especially those in the pyramids of Malpighi. Dr. George Johnson<sup>1</sup> has described, very minutely, this condition of the kidney, and particularly notes the changes which supervene in the vascular system of the gland. In another instance, Dr. Todd has recorded the discovery, in an inflamed "gouty kidney," of "*opaque streaks of deposit of lithate of soda*" in some of the renal cones. These streaks took the direction of the tubes, and certain of the latter were probably occupied by them.<sup>2</sup> We may well exclaim with Dr. Todd, as we reflect upon these vital manifestations and post-mortem revelations—

"How strikingly do these consequences of the long continuance of the malady comport with the humoral view of the pathology of this disease! Not only are those parts which the morbid matter of gout is most prone to affect, materially damaged, but likewise the emunctories through which the poison would make its escape out of the system—the liver and kidneys: these organs have become poisoned by the morbid matters which have escaped, or tried to make their escape from the system through them; and, therefore, it is natural to expect a considerable change in their nutrition."

It is notorious, however, that in most, if not all, of the *metastases* of gout, there are no traces of morbid action upon the organs affected by the repercussion of the disease. The reason of this doubtless is, that when a fatal result occurs in this manner, the morbid action lasts too short a time, notwithstanding its violence, to leave structural traces. Probably a true *spasmodic* action often destroys the patient, in the thoracic and abdominal varieties of retrocedent gout. It is, however, very likely that in many cases of sudden death from these causes, the vital organs have been previously weakened by disease of some sort; and in many cases chronic gout has inflicted a certain amount of injury, for, as we have already seen, the

<sup>1</sup> On Diseases of the Kidney.

<sup>2</sup> This appearance is also noted by Dr. Garrod, who saw "streaks of white matter at the apex of each pyramid and running up in the direction of the tubuli. Kidneys pale and contracted; cortical portion shrivelled." (p. 199.)

continued and recurring malady *does* leave its indications, very decidedly, behind it.

After gout in the *stomach*, Dr. Todd signalizes a "dilated and flaccid state of the organ" as existing, and this is the more marked in proportion as the attacks have been frequent.<sup>1</sup>

In addition to the abundant and often astonishingly copious deposits of the urate of soda into and around the joints, that salt has been found to cover and even to penetrate into the texture of the cartilage investing the affected joints (Watson), and to insinuate itself into the substance of tendons and ligaments (Dr. Wm. Budd). A curious locality is at other times chosen by it—viz., under the skin covering the cartilages of the ears. It has been remarked also over the cartilages of the *alæ nasi* (Todd).<sup>2</sup> Pus sometimes forms around the variously located depots of urate of soda, and occasionally the discharge of this liquid is quite abundant. Generally speaking, also, the joints of the hands and arms exhibit more plentiful deposits of the urate than those of the lower extremities, except in some forms of acute sthenic gout, when the reverse may be observed. The

<sup>1</sup> Op. cit.

<sup>2</sup> Dr. Garrod (op. sup. cit.) states that "sometimes small nodules of urate of soda are found upon the eyelids, especially the lower, now and then in the integuments of the face." He also refers to the great care which is necessary in ascertaining the precise nature of the "white-looking deposits" often occurring about the eyelids and face. Dr. H. Barker saw them on the nose. Dr. Garrod has "observed a true gouty deposit as large as a split pea, apparently attached to the fibrous structure of the corpus cavernosum penis." (p. 86.)

In relation to gouty affections of the eye and ear, Dr. Garrod further remarks: "A form of ophthalmia connected with gout has long been noticed." He adds that it is liable to be confounded with rheumatism, when that is directed to the ocular region. Cases of ophthalmia evidently connected with the gouty diathesis have been observed by Dr. G.; these were instances of conjunctivitis and scleritis. "Gouty iritis is also said to occur." The nodules found upon the cartilages of the ear have been mentioned. "Deposits are not unfrequently found upon the drum of the ear, and have been especially pointed out by Mr. Toynbee, but I have failed to discover a trace of uric acid in several examinations of them. Whether they are ever connected with gouty inflammation, is at present a matter of uncertainty; they should especially be sought for in gouty subjects in whom the joints are much affected with chalk-stones, for if not found in such cases, it is not probable that they would occur in others." (pp. 515, 516, op. cit.)

Accomplished aurists have pointedly alluded to the connection between gouty and rheumatic affections and deafness. Mr. William Harvey (*The Ear in Health and Disease*, London, 1856) specially considers this subject; and we have heard him insist upon the frequency of the connection, whilst observing his aural practice.

In his elaborate work on *The Diseases of the Ear*, just published (London, 1860), Mr. Toynbee refers to the subject, and furnishes interesting illustrations of the reality of the connection, as observed by himself. He says: "The poison of *gout* may also give rise to deafness and other peculiar symptoms in the head." (See the work cited, page 362, English edition.)

interference with the motion of the various joints thus affected is so evident and so familiar to practitioners, and indeed so well known to nearly every one, that we hardly need do more than allude to it as a "morbid effect" of the disease. The fact, moreover, has already been made sufficiently prominent.

**RHEUMATISM.**—Nearly related to gout is the disease known by the term *rheumatism*; an affection which, like its *congener*, may be *acute* or *chronic*, and is characterized by very similar constitutional symptoms and by many local phenomena of like nature, while yet there are several striking points of difference. Thus, we observe indications of irritative action and of inflammatory states of variable severity; fever, anxiety, restlessness, chills, with full, quick and sharp pulse; gastric and intestinal disturbances; thirst, white tongue, foul breath, and acid eructations. Locally, there is heat, pain, and tense, or sometimes doughy, shining redness, with swelling around certain joints, and often affecting neighbouring tissues, as the muscles, tendons, &c. By preference, the larger joints are attacked in contradistinction to gout, which, as we have seen, fixes upon the smaller. There is also the remarkable and very distinctive symptom, or rather local manifestation, of *acid perspiration*, often very profuse and offensive. The latter is apparently the corresponding fact, so to speak, to the local appearance of urate of soda in the tophaceous deposits in gout; for, in true rheumatism, nothing of the sort occurs; in *rheumatic gout*, as will be seen, there is an analogous deposit.

From what we have already indicated, it is not difficult to see a great resemblance between gout and rheumatism; they have indeed been denominated "*first cousins*." The first and most important question for us, concerning rheumatism, is—and it is an inquiry of great practical interest—*does it depend upon excess of uric acid in the blood, and its retention therein?*

The latest views of the pathology of the disease seem to give a directly *affirmative* answer to this question; and, of course, under this aspect of the subject, it devolves upon us to enumerate the affection and its results amongst those "morbid effects" of retention in the blood of the urinary "element" we are now examining. It should, however, be distinctly premised, that many researches and much close study and observation are yet required in order to enable us positively to declare uric acid or any of its products to be the *materies morbi* in rheumatism. Observers, however, at the present day, at least begin to speak with more confidence and decision upon this point. In the first place, we find it more than ever common for systematic writers on medicine to consider gout and rheumatism under one head; often in one chapter. Next, if we examine the language employed in discussing the yet unsettled question as to the *essential cause* of the

disease, we shall observe a tone of much greater decision than in the works published only a comparatively short time since; while the matter is yet left open to doubt—most authorities not fully compromising themselves. We will refer to a few of these opinions. Dr. Barlow (*Manual of the Practice of Medicine*, 1856) says :—

“The external cause [of rheumatism] is generally exposure to cold, especially when producing repressed perspiration. Its internal or essential cause seems to be an abnormal condition of the blood, which contains always an excess of fibrin and of uric acid: the latter is probably the *materies morbi* or peccant matter.” (p. 130, *op. cit.*)

Dr. Bennett (*Clinical Lectures on the Principles and Practice of Medicine*, American edition, 1858) begins his remarks upon the General Pathology of Rheumatism and Gout, as follows :—

“The present theory with regard to these affections is, that they are both connected with an increase of lithic acid in the blood. In rheumatism, this is dependent on excess of the secondary, and in gout on excess of the primary digestion.” (*Op. cit.*, p. 909.)

The latter author also refers to the fact that a considerable amount of *lactic acid* is excreted from the skin, as was taught by Prout, and mentioned by Todd, Watson, and others of note, who have carefully studied the subject. Hitherto, the tendency seems rather to have been to ascribe the morbid phenomena of rheumatism to an excess of the last named acid in the system. Dr. Prout, in the fifth edition of his celebrated work on *Stomach and Renal Diseases*, refers pointedly to this explanation, as being his own belief. While mentioning in a foot-note (p. 549) the opinions of Dr. Garrod as to the relations of uric acid to gout and rheumatism, he says: “In various parts of this work I have spoken of lithic acid as being characteristic of gout, and the lactic acid of rheumatism. At any rate, I agree with Dr. G. that lithic acid has little to do with pure rheumatism; though it is often present in what is called rheumatic gout.” In the latter affection—which is understood to be that variety of gout which attacks all the joints, indiscriminately, and for which Dr. Todd prefers the name of “*general gout*”—it is natural to believe that the chief morbid agency is uric acid, or a salt from it. It has, however, as we previously stated, until somewhat recently, been the persuasion of the majority of observers that lactic acid held that relation to rheumatism, which it seemed plausible to assign to uric acid in reference to gout. In his last edition (1857), Dr. Watson says, in the course of a remarkably clear and accurate *resumé* of the distinctions existing between gout and rheumatism (*op. cit.*, vol. ii. p. 761, English edition): “Gout is often, rheumatism is never, associated with chalk-stones; and conformably with this distinction, Dr. Garrod has

taught us that uric acid in excess is present in the blood of the gouty, and not present in that of rheumatic patients."<sup>1</sup>

The manner in which Dr. Todd (*op. sup. cit.*) refers to the method pointed out by Dr. Garrod for detecting uric acid in the serum of the blood, in gouty cases, seems decidedly indicative of his own views as respects the existence of uric acid in excess in the blood in gout and not in rheumatism; and in this connection, we are glad of an opportunity to give the method of Dr. Garrod, above referred to. Dr. Todd says:—

"Dr. Garrod has made out a positive physical character of gout, which may be regarded as surely diagnostic of that disease from rheumatism. It consists in the discovery of uric acid in the blood-serum or the blister-serum. And his process is ingenious, and so simple that any one may use the test, however little accustomed to chemical manipulation. A little serum is put into a watch-glass, and to it are added five or ten drops of acetic acid. In this acidulated serum a small skein of worsted is laid, and the watch-glass is set aside under cover to protect it from dust. After a few hours, the crystals of lithic acid, if it exist, will be found adhering to the threads."<sup>2</sup> (*Op. cit.*, pp. 408-9.)

Dr. Henry William Fuller, of London, Assistant Physician to St. George's Hospital, in his very scientific and able treatise on *Rheumatism, Rheumatic Gout, and Sciatica*, published in 1852, takes the ground that *lactic acid* is the *materies morbi* in rheumatism. He thus falls in with the opinions of Drs. Prout, Todd, Williams, and others, who so believed, although not positively asserting the fact as indisputable. Dr. Fuller considers the cause of the disease to be a poison in the blood, and which is generated in the system as the product of a peculiar form of mal-assimilation—of vicious metamorphic action. This poison it is "which excites the fever, and produces all the pains and local inflammations which are often found associated in an attack of rheumatism." (*Op. cit.*, p. 28.) He then points out the fact that although the fever may be increased by the occurrence of the local inflammations, "it is essentially independent of them," and often is well developed before they begin. If the virus is in small quantity in the blood, then only slight wandering pains are produced;

<sup>1</sup> Speaking of Dr. Prout's belief in regard to the *lithic* and *lactic acids*, and their relations to gout and rheumatism, Dr. Watson relates certain experiments, by Dr. Richardson, upon animals. Lactic acid introduced into the peritoneal cavity of a healthy cat, produced irregular cardiac action in two hours. The animal was found dead the next morning, and no peritoneal inflammation was discovered, but "marked endocarditis of the left chambers of the heart. The mitral valve was inflamed and thickened, and covered on its free borders with firm fibrinous deposits. The whole inner surface of the ventricle was highly vascular." Similar results were observed in a dog experimented upon in like manner. No textural alterations were found in the joints.

<sup>2</sup> In Dr. Garrod's late work (*Gout and Rheumatic Gout*) we find this process much more elaborately described. See pages 110-113, *op. cit.*

if in large quantities, and increasing, the effects are usually proportionate. Some constitutions, of course, manifest more resistance than others.

We have previously cited the authority of Dr. Garrod in reference to the morbid agency in gout and rheumatism;<sup>1</sup> and in his late work, we find him reiterating his views, and pronouncing the urate of soda "*pathognomonic*" of gout. Some of this author's conclusions thus lately arrived at, or rather confirmed—for such, we believe, has always been his doctrine—are so positive and so much to the point for our present purpose, that we quote them. His analyses show that "healthy blood contains the merest trace of uric acid or urea, so small as to be in general undiscoverable, except by the most minute and searching chemical examination, and not always then.

"That, in gout, the blood is invariably rich in uric acid, which exists in the state of urate of soda, and can be separated from it, either in the form of the crystalline salt in acicular needles, or as rhombic crystals of uric acid.

"That, in acute rheumatism, the blood is free from uric acid, or, at least, contains no more than in health.

"That the perspiration seldom contains uric acid; but that, in gout, oxalate of lime may be crystallized from it, as also from the blood."<sup>2</sup>

In the above expressions of opinion, founded on careful analysis, we find Dr. Garrod distinctly declaring that the blood is free from uric acid, or only contains a normal amount thereof; he therefore does not consider that acid the cause of rheumatism.

Such are some of the opinions to which we referred; and while, in view of the existing difference in the decisions of equally eminent men upon this point, we cannot look upon the pathology of rheumatism as by any means definitively settled, it seemingly devolves upon us to consider the disease as a condition referable to excess of uric acid in the system, in deference at least to the opinion of many of the latest observers, whose position, judgment, and opportunities for the accumulation and weighing of evidence are such as to entitle their announcements to the greatest respect. In this regard, however, as much can be said for those who hold the opposite views, or who do not fully compromise themselves; but we shall be quite safe, at least, in discussing the question according to the plan above announced. Our own conviction, hitherto, has always been wholly in favour of the *lactic acid* theory; and, within a day or two, having put the question to a highly-cultivated and well-informed medical friend—"What do you consider the *materies morbi* in rheumatism to be?" his reply was, after a

<sup>1</sup> "The Nature and Treatment of Gout and Rheumatic Gout."

<sup>2</sup> In giving these opinions of Dr. Garrod, we followed the statement furnished in the *Lancet* of December 24th, 1859, not then having seen Dr. G.'s work. The account is by the Reviewer, condensed from the book itself. We have lately, however, had the volume at our disposal, and can testify that it is a most satisfactory, complete, and erudite treatise.

few moments' consideration, "Some product of *lactic acid*—some of the lactates."

Whatever the fact may be, it is clear that the fault of *deficient excretion* is equally active in rheumatism as in gout; the former is as distinctly a blood-disease as the latter.<sup>1</sup> The deranged excretory function ("Uric-acid-excreting"), however, chooses a different field for the manifestation of its disorder or impairment; the disarranged balance between the excess of acid and the excreting power being as evident in one as in the other. Dr. Bennett (*op. cit.*) writes very clearly and comprehensively on this point. He remarks: "In both diseases there is an undue balance between the excess of lithic acid and the power of excretion—in rheumatism by the skin, and in gout by the kidney. This pathology serves to explain the similitudes and differences existing between the two affections. In both there is a certain constitutional state dependent on deranged digestion, during which, exciting causes occasion local effects."

He then signalizes the fact that in rheumatism the *exciting* causes are those of a depressing nature, and are usually exerted upon the poorer classes. The chief provocatives of rheumatism, as is well known, being cold and wet, bad and insufficient food, and hard labour. As we have already set forth, precisely the opposite immediate causative elements are active in gout, *i. e.*, luxurious and intemperate diet, indolence and self-indulgence of all kinds. Dr. Fuller's idea—and which is, doubtless, that of every reflecting and intelligent practitioner—is, that the morbid material acting in the blood, is often, if not nearly always, the *sole* cause of rheumatism—secondary or exciting causes not coming at all into play, or proving ineffective, if brought to bear on the system. They are only promotive agencies, not causative elements.

It will not be expected of us, we conclude, specially to detail the course of rheumatic fever, or of chronic rheumatism. Indeed, with the present undetermined state of the pathology of the disease, we might perhaps have deemed it justifiable to withdraw the disease from the category of the "morbid effects" of retention of an element of the urinary secretion in the blood. It could hardly, however, be other than an omission of some moment, had we not carefully examined the present belief on the subject; and, having done this with considerable research, we place in due order the names of all the authors of most eminence in regard to the subject, within the last few years, whose works we have been able to consult. Their opinions are expressed with more or less positiveness; some only implying their belief, others boldly asserting it.

<sup>1</sup> "In truth, acute rheumatism is a blood-disease. The circulating blood carries with it a poisonous material, which, by virtue of some mutual or elective affinity, falls upon the fibrous tissues in particular, visiting and quitting them with a variability that resembles caprice, but is ruled, no doubt, by definite laws, to us, as yet, unknown." (Watson, *Practice of Medicine*, vol. ii. pp. 738-9.)



*What is the Materies Morbi in Rheumatism?*

LACTIC ACID.					URIC ACID.				
Dr. Prout	.	.	.	(1848.)	Dr. Barlow	.	.	.	(1856.)
" Fuller	.	.	.	(1852.)	" J. H. Bennett	.	.	.	(1858.)
" Todd	.	.	.	(1857.)	" Copland	.	.	.	(1858.)
" Watson	.	.	.	(1857.)	" Thudichum	.	.	.	(1858.) <sup>1</sup>

With respect to Drs. Thudichum and Golding Bird—the latter of whom might have been ranged with the former in the above table—their opinions are inferred from expressions in their works, such as we quote in a footnote.<sup>2</sup>

It may here be added that Dr. Prout intimates it to be a very supposable and plausible doctrine that the phenomena of rheumatic gout—which, by the way, both he and others pronounce very difficult to relieve—may be explained by the fact of the concurrent action of both lactic and lithic acid in the system. This form or combination of disease requires to be described more at length, as being less familiar than rheumatism, and presenting more novel points for inquiry.

**RHEUMATIC GOUT.**—We have already referred to this affection, which presents a singular combination of the characteristics of rheumatism and gout. Without resembling either, as a whole, it partakes, seemingly, of the nature of both. Unlike gout in general, it attacks the weakly individual as well as the strong, and quite as readily; or else those who are robust, when either physically or mentally depressed. In this malady the analogy of the two diseases is most apparent; or rather, their dependence upon a

<sup>1</sup> Dr. Garrod might, by inference, be placed in the left-hand column; since, although he does not, so far as we have been able to ascertain, say that rheumatism depends on the presence of an excess of *lactic* acid in the blood, he demonstrates the absence of *uric* acid in the cases he has examined, and evidently does not consider it, in any wise, dependent thereon. (See his late work on *The Nature and Treatment of Gout and Rheumatic Gout*.)

<sup>2</sup> "In the two allied affections, gout and rheumatism, exclusive of the many neuralgic diseases popularly referred to the latter, a remarkable tendency to the formation of an excess of uric acid, both pure and combined, occurs." G. Bird, *Urinary Deposits*, English edition, by E. Lloyd Birkett, M. D., 1857, p. 150.

"As a question clearly put is half the answer, we may be permitted here to consider what proximate conditions of the system a rise or fall in the quantity of uric acid beyond the normal limits is likely to indicate. A deficiency may be due to a diminished production in the system, as in anæmia, or to retention, as in certain stages of gout and rheumatism. It is at least questionable whether the retention is *always* due to diseased action of the kidney. Any disease, however, which interferes with the secreting power of the kidney by changing its structure, such as Bright's disease, is certain to cause retention of uric acid in the blood, in proportion to the retention of the other constituents of urine. (Scarlatina seems to make an exception. \* \* \*.) Thudichum, *op. cit.*, p. 95.

similar cause is perhaps most clearly seen. We observe, however, that Dr. Garrod, in his work just published,<sup>1</sup> does not incline to the idea that this affection is actually a combination of gout and rheumatism. He prefers, moreover, to employ the term "*Rheumatoid Arthritis*," and remarks: "If we agree to name a disease simply from its external characters, then I admit that the term rheumatic gout is not inappropriate; but if we advance further, and have regard to more intimate pathology, then I deny the propriety of the name: acting upon the former principle, we should be equally justified in calling some cases of scarlatina or measles by the compound term of rubeolo-scarlatina, and we know that these diseases were not separated two centuries ago \* \* \*." "Although unwilling to add to the number of names, I cannot help expressing a desire that one might be found for this disease, not implying any necessary connection between it and either gout or rheumatism. Perhaps *Rheumatoid Arthritis* would answer the object, by which term I should wish to imply an inflammatory affection of the joints, not unlike rheumatism in some of its characters, but differing materially from it." (*Op. cit.*, pp. 533-4.) Dr. Garrod also refers to the fact that but few authors recognize any existing combination of gout and rheumatism, many even strongly oppose such a doctrine. He mentions Boerhaave, Van Swieten, Cullen, Heberden, and Watson, as not alluding to such a connection or fusion, and quotes Sir C. Scudamore, as saying "that the textures which have been long affected with gout, become so much weakened as to be very susceptible to vicissitudes of temperature; and in this way the general disorder may partake of rheumatism. It was only thus that he could attach any propriety to the very common expression *rheumatic gout*. It would appear that the term is often made use of, but seldom attempted to be defined with precision." (*Op. cit.*, p. 527.)

The affection has been known by various names. Thus Dr. Haygarth styled it "*Nodosity of the Joints*;" Cruveilhier, "*Usure des Cartilages Articulaires*;" Dr. Adams, of Dublin, "*Chronic Rheumatic Arthritis*." Dr. Garrod, who mentions the above designations, also says: "It has sometimes received a name dependent on its situation; for example, rheumatic gout, when the wrists, hands, and feet are affected; chronic rheumatism, when in the shoulder, elbow, or knee, either singly or simultaneously; and *morbis coxæ senilis*, when located in the hip. Occasionally it assumes an acute, or rather subacute, character, but more generally it is chronic throughout." (p. 533.)

Neither *sex* nor *condition* in life seems to have any influence in procuring immunity from this disease. According to Dr. Adams, the hip-joint is most often affected in males; in females, the wrists and hands. He found

<sup>1</sup> The Nature and Treatment of Gout and Rheumatic Gout. By Alfred Baring Garrod, M. D., F. R. S., Fellow of the Royal College of Physicians, Physician to University College Hospital, etc. etc.; London, Walton and Maberly, 1859.

it more prevalent amongst the poor and labouring classes; Sir Benjamin Brodie considers it most common in the higher classes. This diversity of opinion, Dr. Garrod explains by referring it to the "difference in the class of cases more prominently brought under each surgeon's notice." (*Op. cit.*, pp. 534-5.)

The *main characteristics* of the disease may be grouped as follows: Pain, of a migratory nature, and which is often very severe and obstinate. It is sometimes aggravated at night, and also by heat. (Garrod.) Motion is extremely painful to an affected joint, especially after prolonged rest. There is notable frequency of recurrence, and predilection for the smaller joints. The joints attacked become, after a time, swollen; fluid is effused in considerable quantities into the cavities of the joints, and fluctuation is often perceptible. The ratio of helplessness is, of course, in relation with the number of joints crippled; generally, none of the articulations escape, when once any of them have been invaded. There is usually but little accompanying febrile excitement and constitutional sympathy; although this depends, very distinctly, upon the number of joints attacked; that is, upon the extent, or degree of universality of the disease. (*Auct. cit. et al.*)

*Complications.*—Cerebritis, pleuritis, inflammation of the eye. The latter is comparatively rare; all the ocular tissues may be affected; generally, however, if the patient have treatment, the choroid coat and the iris escape. Exhausted and shattered constitutions are those most obnoxious to ocular inflammation in connection with rheumatic gout. (Fuller.)

*Results.*—Thickening and permanent enlargement of the structures forming, and (less frequently) of those surrounding the joints; occasionally, there is cuticular desquamation, as in gouty cases. In the chronic form, which, as we have stated, is most commonly observed, the articular cartilages are affected, the ligaments about the joints are stretched, and the ends of the bones are irregularly enlarged. The synovia subsequently becomes absorbed, and the capsular membrane is left much thickened. The *ligamentum teres* of the hip, and the tendon of the biceps are sometimes destroyed, and even completely removed. Not only the articular, but the inter-articular cartilages are absorbed; this is observed in the knee-joint, the wrist and the lower jaw. (Garrod.) When the disease has been very prolonged and severe, the synovial membrane becomes not only thickened, but droops into the articular cavity; or, as Dr. Fuller points out, "a dense, ligamentous substance, resulting probably from some peculiar alteration in the synovial membrane, is seen interposed between the articulating surfaces; or small irregularly shaped cartilaginous bodies are found, either loose within the joint, or attached to it by pedicles formed of thickened synovial membrane." Sometimes these excrescences are bony; and others of a vascular nature likewise exist. (Garrod, *op. cit.*) The opposite surfaces of the bones forming the joints, being denuded by chronic wasting of the cartilages, and rendered smooth by attrition upon each other, are

found to be white, glistening, and ivory-like in appearance.<sup>1</sup> The latter condition, we conclude, is that observed in what is termed "dry chronic arthritis"—*Arthrite chronique sèche* of the French writers. We have had the opportunity of witnessing this alteration in several instances; the state is that known as *eburnation*. In specimens which we have seen, the change of texture was chiefly marked in the track of the *greatest attrition*, in the affected joint; a fact noticed particularly by Dr. Garrod. (*Op. cit.*)

"The denuded surfaces become partly worn away, and a smooth enamel is formed by the mutual action of the bones on each other, and around the articular surfaces thus acted upon bony vegetations arise.

"In most joints, after the fluid has become absorbed, a crepitus is felt on movement from the rough surfaces grating against each other." (p. 540.)

There is, in certain instances, a pulverulent deposit, usually consisting of lithate of soda, but containing also, at times, lithate of potash, ammonia and lime, chloride of sodium, phosphate and carbonate of lime. This lightly incrusts either the entire surfaces of the affected joints, or only portions thereof; and it may pervade their solid structures.

Although this deposit is identical, or nearly so, with that of gout, and occurs alone in those cases of rheumatic gout most nearly resembling genuine gout, yet, says Dr. Fuller, "I cannot therefore admit the conclusion that the existence of such deposit is of itself sufficient to mark such cases as examples of true gout." (p. 331.) The reasons he assigns for this opinion are, briefly: 1. The occurrence of these cases in "thin, spare persons of temperate habits," who have had rheumatic rather than gouty symptoms; 2. The difference in form and situation from the chalk-stone deposit of true gout; 3. The disease occurs, often, in those who formerly have had pure uncombined rheumatism; and these persons sometimes exhibit the well-known external traces of that disease. This author distinctly avows his belief that rheumatic gout is a true combination of the two diseases whence it derives its name; and when, on dissection, one joint is found to present most evidence of the gouty, and another most of a rheumatic element having been at work, he explains this by supposing that more of one influence was in force during the time such a joint was affected; and the other result rests upon similar action from the opposite influence. Dr. Garrod, who, as we have already stated, does not consider the affection to be a compound of gout and rheumatism, admits, notwithstanding, its greater resemblance to rheumatism than to gout; but he believes that much harm has been done practically, by confounding it with either gout or rheumatism.<sup>2</sup>

<sup>1</sup> Fuller.

<sup>2</sup> We take this opportunity to refer those interested in these subjects, to the elaborate and interesting treatise of Dr. Garrod, which we have designated above. The differential diagnosis of gout and rheumatism is clearly set forth, and the work is fully illustrated by tables, plates, etc.

Such, then, are the principal results—if we adopt the theory received, as we have seen, by so many reliable observers, viz., that rheumatism depends on retention of uric acid in the blood—of this poisoning of the blood by the undue presence of the *materies morbi* in the system; and both in this and the previously considered affection (gout) we have a series of symptoms indicative of the great extent to which the infection of the blood sometimes attains; and also ocular evidence, both during life and after death, of the power and virulence of the poison.<sup>1</sup>

We have not treated of the occurrence of *metastasis* of rheumatism under a separate head, because the chief danger in this light is of the *heart* being affected, and we have already pointed out the frequency of such attacks, and the necroscopic phenomena. Sufficient allusion, we believe, has also been made to the occasional transfer of the affection to other organs. The *sequelæ* of the disease have likewise been incidentally mentioned under the head of *results* and *consequent diseases*. It is, however, not supererogatory again to refer pointedly to the extreme danger which environs those who, during rheumatic fever, have also had heart disease. Such persons, even if apparently entirely recovered, *are never to be considered out of danger*, and they require, of course, due warning from their physicians, and the exercise of great discretion on their own part, in order that they may be fully aware of their insecurity, and able, so far as is possible, to guard against a return or re-awakening of their formidable malady.

We have thus endeavoured to present the chief phenomena, resulting directly and also secondarily from retention of uric acid in the blood. Whilst the manifestations of *gout* and *rheumatism* have been, of necessity, prominent, the reader will not have failed to remark the lengthy list of antecedent, concomitant, and subsequent, ailments, seemingly more or less dependent upon that morbid influence which, by common consent, is allowed to be the active promoter, and, we may say, the originator of the disease. From the slighter derangements of the general health, through all the phases of dyspeptical disorder, to the agonizing paroxysms of gout and rheumatism, their *sequelæ*, exceedingly dangerous metastases and disastrous ravages upon the external form, both as to appearance and freedom of motion; and finally in the *post-mortem* evidences of its activity, do we not seem to recognize the presence and morbid power of that

<sup>1</sup> It should be stated that the testes, as well as the skin, periosteum and aponeuroses are occasionally affected, either concomitantly and acutely, or subsequently and in a more chronic manner. Dr. Fuller and others have enlarged upon the predilection of rheumatism for "the white fibrous tissue." The former author refers to the mention by Dr. Watson, of rheumatism of the articulation of the jaw, and also of that of the membranes of the spinal cord by Dr. Copland and others. (*Op. cit.*, p. 46.) We need hardly refer to the fact of the frequent association of rheumatismal attacks—in predisposed subjects—with gonorrhœa.

WATSON: 1841.

"element of the urinary secretion" we have been considering, prevented as it is in such cases from obtaining an exit through its natural excretory channels?

CREATINE AND CREATININE.—*Formulae*: Creatine,  $C_8H_9N_3O_4 + 2 \text{ Aq.}$   
—Creatinine,  $C_8H_7N_3O_3$ .—<sup>1</sup>

*Creatine*.—This substance, discovered by Chevreul, in 1835, is crystallizable, and is derived from the juice of flesh. It is stated to be "present in the blood and urine of man and of all animals hitherto examined." (Thudichum, *op. cit.*) Both this substance and creatinine, in the form of chloride-of-zinc salt, were found in the urine by Heintz and Pettenkofer, simultaneously, in 1844; but these chemists did not then recognize their identity with the above-mentioned product of the juice of flesh. Liebig, in 1847, demonstrated both creatine and creatinine to be "constant ingredients of the juices of the flesh of nearly all the classes of vertebrate animals, and of the urine of man." (*Idem.*)

Although now a recognized element of the urine, creatine is contained therein in an exceedingly minute proportion. It is always present in the blood, which is a fact important to note in respect to our present inquiry; for, if naturally existing in the vital fluid as a product of a chemical muscular change or waste, it is doubtless innocuous so long as it is finally

<sup>1</sup> Thudichum.

*Chemical Composition of Creatine and Creatinine.*

<i>Creatine</i> :	8 equivalents of carbon	.	.	.	48	36.64
3	"	"	nitrogen	.	42	32.06
9	"	"	hydrogen	.	9	6.87
4	"	"	oxygen	.	32	24.43
					<hr/>	
Atomic weight of dry creatine					131	100.00
To procure the formula for "crystallized creatine,"						
Take, 1 atom of dry creatine					131	87.92
and 2 atoms of water					18	12.08
					<hr/>	
					149	100.00
<i>Thudichum.</i>						
<i>G. Bird.</i>						
<i>G. Johnson.</i>						
$C_8N_3H_9O_4 + 2HO = 131 + 18 = 149.$						
$C_8H_{11}N_3O_3$						
<i>Creatinine</i> :	8 equivalents of carbon	.	.	.	48	42.48
7	"	"	hydrogen	.	7	6.19
3	"	"	nitrogen	.	42	37.17
2	"	"	oxygen	.	16	14.16
					<hr/>	
Atomic weight of creatinine					113	100.00
<i>Thudichum.</i>						
<i>G. Bird.</i>						
<i>G. Johnson.</i>						
$C_8N_3H_7O_3 = 113.$						
$C_8H_7N_3O_3$						
The formula expresses "crystallized" creatinine.						

discharged by the kidneys, its proper emunctories.<sup>1</sup> And unless we suppose extensive renal disease and destruction of tissue or serious obstruction to the excretion of urine, it is not possible that undue accumulation of this substance in the blood should take place. Authors tell us that it is to be considered as undoubtedly excrementitious (Golding Bird, Thudichum); therefore the blood must be depurated from it as it is formed and thrown in upon the circulation, or doubtless the phenomena of systemic disturbance, such as would arise from contaminated blood, would occur. And with this view, we should expect to observe somewhat analogous morbid phenomena to those produced by uræmic poisoning—bearing in mind the close relation to urea which is held by creatine, as has already been mentioned, on the authority of Dr. Thudichum.<sup>2</sup> This supposition, which naturally occurred to us in view of the *excrementitious* nature of the substance in question, seems to find confirmation in the following remarks of the last-named eminent observer. “In disease, the quantity of creatine, together with that of creatinine, might serve to indicate the intensity of any spasmodic or convulsive action. The question as to its quantity in tetanic and epileptic disease is one of high interest. Cases of paralysis agitans, in which the spasmodic action ceases with sleep, may perhaps afford good opportunities for demonstrating the influence of rest and motion; though the different nutrition in the muscle may, perhaps, vary

<sup>1</sup> “Creatine is present in the blood, by which it makes its way to the kidneys. It occurs in the urine as a regular ingredient, though present in small quantities only. It is partly transformed into creatinine, most probably somewhere between the muscle and the urinary residue out of which the zinc salt crystallizes. For in the muscle, creatine has by far the preponderance over creatinine; in the urine, creatinine over creatine. Creatine is, therefore, truly excrementitious; its relation to urea proves this beyond doubt. Its exclusive occurrence in the muscles shows the seat of its formation; it is, with other matters, a product of the chemical changes in the muscles.” (Thudichum, *op. cit.*, p. 120.)

<sup>2</sup> In a uræmic case, Hoppe extracted five times the normal amount of creatine from the muscles of the patient. (Braun, *op. cit.*, p. 99.)

Dr. Golding Bird (*Urinary Deposits*, 1857) has some interesting remarks in reference to the modes of excretion of creatine and creatinine, and also in regard to their relation to urea. “Although we have seen that creatine and creatinine are both found in the urine, we must not conclude that they are entirely excreted in this manner. It is very probable that a considerable proportion of creatine is resolved into uric acid or urea before its final elimination. We have already seen the chemical relation of creatine to uric acid, and to urea; its metamorphosis into the latter body, and into the peculiar substance sarcosin (which requires only the addition of the constituents of water to represent the elements of lactate of ammonia) is so readily effected, that a similar change occurring in the body is rendered very probable.” (p. 109, English edition.) We may thus observe that it is very possible for a large amount of creatine and creatinine to be thrown out of the system in other ways than by the kidneys—a fortunate circumstance in renal disease, both when these and other urinary elements are concerned.

the chemical changes in some degree. These suggestions for future researches must not be taken for theories or suppositions." (*Op. cit.*) There are almost no *data*, so far as we are aware, which could enable us to set forth, with any precision, the effects of an undue accumulation of either creatine or creatinine, considered as urinary elements, in the blood. As the author last quoted intimates, "future researches" can alone enable observers to furnish satisfactory details; and although he is careful to repudiate the idea of issuing theories or suppositions, there seems no great presumption in hazarding the latter, as we have done in a former paragraph; especially in view of a dearth of facts which precludes our offering much upon the subject.

It is evident, however, that one practical deduction may be drawn from the fact that these substances are the result of muscular waste, viz., that if there is an excessive amount of them observed in the urine for a long time, this waste will also become extreme—consequently, rest and the appropriate treatment for preventing debilitating action should be observed.<sup>1</sup>

*Creatinine*.—This "substance is found in the muscles of the vertebrate animals, and in the urine of man in larger quantities than in the muscles. It is the product of the natural or artificial decomposition of creatine \* \* \*." (*Thudichum*.) Its component elements are carbon, hydrogen, nitrogen, and oxygen.

We have nothing further to present relatively to creatinine than what has already been incorporated under the head of creatine.

*HIPPURIC ACID*.—(Symbol:  $\overline{H}$ . Formula:  $C_{10}H_8NO_5 + HO$ .)<sup>2</sup>

Liebig has announced this acid to be a constant ingredient of human urine; a statement which, according to Thudichum, has lately been negatived by Duchek. It is stated that its existence was demonstrated in the urine of young infants by Scheele, Fourcroy, and Reynard. Benzoic acid, when ingested, becomes hippuric acid in the body. (*Ure, Med.-Chir. Transact.*, vol. xxiv.; and Keller, *Ann. d. Chem. und Pharm.*, xliii. p. 198; Thudichum, *op. cit.*)

<sup>1</sup> See, among other references on this point, Dr. Hassall's work on "The Urine in Health and Disease."

<sup>2</sup> Or,  $C_{10}H_8NO_5$ .—*Thudichum*.

*Chemical Composition of Hippuric Acid.*

Carbon	.	.	.	.	.	.	.	.	60.335
Hydrogen	.	.	.	.	.	.	.	.	4.469
Nitrogen	.	.	.	.	.	.	.	.	7.821
Oxygen	.	.	.	.	.	.	.	.	22.347
Water	.	.	.	.	.	.	.	.	5.028

100.000

*Thudichum.*



The *pathology* of hippuric acid is fully as undetermined as that of the two substances we have last considered. Its occurrence in the system in excess has generally been attributed and easily referable, to peculiarities in the diet. According to Dr. Golding Bird and some others, it seems to be found especially in those who live exclusively upon vegetables, milk, and certain kinds of fruit, and to be most constantly observed in persons of indolent habits. This is esteemed the reason why it is detected in stalled cattle, or in well-fed stallions, and not noticed, but replaced by benzoic acid, in cattle that are worked or driven. (*Thudichum et al.*) Dr. Bird ascribes its presence in the urine of nursing infants—a fact already referred to—to their “mal-assimilating the large quantity of carbon contained in the food.” This author, moreover, does not consider that it interferes with the production of uric acid; but he observes that in hippuric urine there is generally a deficiency of urea. Reference is also made by him to very interesting cases by Bouchardat, Garrod, and Pettenkofer. In Bouchardat’s case, the acid was observed to coexist with albumen in the urine,<sup>1</sup> and an absence of uric acid. The patient had lived for nine years on a milk diet, was fifty-three years old when the case was noted, had resided in the country, had good general health, was in easy circumstances, was the mother of one child, and had ceased to menstruate at the age of forty-five. Gastric and hepatic difficulties of an obscure nature led to her adoption of the milk-diet, and her health was restored. She then partook of a more mixed diet, eating some meat and vegetables; after a time she again became ill, and the chief symptoms were lassitude, dryness of the skin (perspiration having previously been profuse); vague pains in the hepatic region; jaundiced hue; the feces were black; the mouth dry, with a bad taste; there were headache and tinnitus aurium; imperfect vision; palpitation of the heart; excited pulse; anæmic murmur in the carotids; some œdema of the lower limbs; dyspnœa. The chief phenomena, however, were excessive thirst and increase in the quantity of the urine. She often drank from six to ten pints of water in a day. The patient died exhausted.

Dr. Garrod’s case was observed in the person of a young man, twenty-three years of age. The first signs of constitutional disturbance were “general malaise,” with an excretion of an excess of urea from the kidneys, accompanied by a deposit of the ammoniaco-magnesian phosphate. Atonic dyspepsia, with lumbar pain, succeeded. At this time, hippuric acid, in “long crystals,” was detected, and these were slowly incrustated with uric acid. This lasted for several days, and a pint of urine yielded about 40 grains of hippuric acid. Uric acid and urea were observed in normal proportions. The hippuric acid soon decreased, and the urine finally

<sup>1</sup> Dr. Prout remarks that both xanthic oxide and hippuric acid “are undoubtedly of albuminous origin.” (*Op. cit.*, p. 238.)

became normal. "No information as to the source of the hippuric acid could be obtained from the history of the patient. He had lived on a mixed diet, and never used any excess of vegetable food, nor had he ever taken any benzoic acid." (*Op. cit.*, p. 211.)

The case reported by Dr. Pettenkofer is regarded by Dr. Bird as perhaps the most interesting of the three. The patient was a girl thirteen years old, affected with chorea, and long subject to it, under the care of Dr. De Marcus, of the Julius Hospital, Wurzburg. There had also been "anomalous hysteric symptoms." She had for a long time lived on apples, bread, and water, refusing any other food. The urine was yellow, limpid, and faintly acid when first excreted; it soon became alkaline, and deposited crystals of the triple phosphate of magnesia. Adding hydrochloric acid to it, after moderate concentration there was "a copious formation of crystals of hippuric acid. The addition of nitric acid, by its oxidizing influence, caused the deposit of hippuric to be replaced by one of benzoic acid. In 1000 parts of urine there were—of

"Water . . . . .	959.332
Solids . . . . .	40.668
	<hr/>
	1000.
Solids soluble in alcohol . . . . .	18.451
" insoluble in alcohol . . . . .	9.417
Anhydrous hippuric acid . . . . .	12.800
	<hr/>
	40.668

Fixed salts, containing much carbonate of soda, 19,599.

"The characters of the urine in this case approached those of an herbivorous animal, in the presence of hippuric acid and of carbonate of soda in the ash, as well as in the absence of uric acid.

"The hippuric acid disappeared, and the urine assumed its normal proportions on inducing the girl to return to a mixed diet." (*Op. cit.*, pp. 211, 212.)

We have given the substance of these cases, because they seem to bear so directly upon the portion of our subject now under examination. If, as may reasonably be inferred, the morbid phenomena, both the early and the later, may be ascribed to that state of the system which at last declared itself by the discovery of an excess of hippuric acid in the urine, we may logically argue that this was the morbid agent; and that the surcharging of the blood with it, and the contamination of the various organs by this vitiated current, is the most plausible explanation. At all events, there seems to have been a direct connection between the morbid condition and the excess of the acid in the system. Dr. Bird and others, as has been mentioned, ascribe its presence in the urine in great excess, to the use of a not sufficiently nitrogenized diet, or to mal-assimilation of the carbon of the food. It has been presumed possible that, through the kidneys, hippuric

acid *vicariously* depurates the liver from any excess of carbon. (Bird.) Supposing this to be true, and renal disease to supervene under these circumstances, the most disastrous results would seem to be unavoidable.

There is no symptom or set of symptoms, so far as we are aware, which would indubitably indicate an excess of hippuric acid in the blood; and the manifestations which we have enumerated, occurring as directly antecedent phenomena to the detection of such an excess, and seemingly dependent upon it, are only to be taken as *probably* the explanation thereof. It is, at least, reasonable to conclude, as we previously remarked, that when the acid appears, more or less suddenly, in excess in the urine, it *has been* equally so in the blood, and for a longer or shorter time—the period, possibly, being indicated more or less distinctly by certain morbid signs. Dr. Golding Bird closes his remarks upon the Pathology of Hippuric Acid in the following terms: “My own experience in these cases has been too limited to justify my offering any opinion on the pathological complications attending them. From what little I have observed, I feel inclined to believe that when an excess of hippuric acid exists, it may always be regarded as traceable to, or pathognomonic of, the deficient function of the liver, lungs, or skin, the great emunctories of carbon; or to the use of food deficient in nitrogen. It hence follows, that our treatment will consist in appealing to the function at fault, and carefully regulating the diet.

“I would suggest the propriety of seeking for the presence of hippuric acid in the urine, where it is copious, of low specific gravity, but slightly acid or neutral, and occurring in persons who have a dry and inactive state of surface, with anæmia. In many pseudo-chlorotic cases in both sexes, I am inclined to believe an abnormal proportion of this acid will often be met with.” (*Op. cit.*, p. 213.)

Dr. Thudichum refers to the discovery, by Lehmann, of hippuric acid in diabetic urine, whenever he had sought for it; and also in the acid urine of fever-patients, “of which it is said to cause, in part at least, the acid reaction.” Hünefeld and Duchek confirmed the experiments of Lehmann. Schlossberger found hippuric acid in the scales of ichthyosis. Whether this was only an isolated instance, “or whether it is of frequent or constant occurrence in that disease,” is not stated. (*Auct. ante cit.*)

Many observations are needed before we can attain to any more precise knowledge of the pathology of hippuric acid. The subject is yet in that undeveloped state which induced Dr. Thudichum to conclude his chapter upon it in these words: “The reader will think this a very unsatisfactory chapter, and so indeed it is. We want observations, for which there is a large field open. But undoubtedly some technical difficulties will have to be overcome first, before the analysis of hippuric acid can be made with sufficient accuracy.” (*Op. cit.*, p. 152.) This author has recently investigated the subject in its chemical, physiological, and pathological relations; and if he finds the stores of information in regard to it so meagre, and if

Dr. Prout was obliged to confess that he was not aware that hippuric acid, either in excess or in deficiency, is characteristic of any peculiar disease (*op. cit.*, p. 239), we surely need not shrink from avowing the poverty of our own knowledge in the matter.

#### CHLORINE: CHLORIDE OF SODIUM.<sup>1</sup>

Were we to follow Dr. Golding Bird's estimate of the "essential" elements of the urinary secretion, we might now pause in our examination of the list of ingredients which we at first enumerated as entering into its composition. Dr. Bird, after mentioning what he terms the "Organic Products," viz., urea, uric acid, creatine, creatinine, colouring and odorous principles, together with hippuric acid and lactic acid, which latter he also styles "accidental constituents," says that this "class of ingredients can alone be considered as really essential to the urine, and characteristic of it as a secretion, the kidneys being the only organs which normally eliminate these elements from the blood." The *saline* ingredients, as he remarks, "are met with in most secretions of the body, with the exception of the sulphates, which are rarely found except in the urine." The "ingredients derived from the urinary passages" (Dr. Bird's *Third Class*) are found "in all fluids passing over mucous surfaces, the phosphate of lime being derived from the mucus, of which it is a constituent."

Since, however, there are many interesting and important points connected with the consideration of the remaining constituents of the urine as given by Dr. Thudichum, whose table we have adopted in preparing this essay, we will bring them separately under consideration according to our original plan. What we have to present, however, will naturally be more general, since we have no affections to consider in this relation, which like gout and rheumatism seem to depend so entirely upon some morbid matter retained in the blood. That an excess or diminution of the chlorides and of other matters in the system, has a greater or less bearing and significance in certain diseases, seems to be proved in many instances, and in others rendered extremely probable. It will be our object in the remainder of this essay to illustrate these positions so far as we may be able; bearing in mind that our main purpose is to indicate the results determined by the undue presence of these elementary substances in the circulation.

With regard to the mere presence of *chloride of sodium*—which substance we shall make the foundation of our remarks—in the blood, it is well known that there is always a greater or less amount taken into the system with the food. There is, indeed, a strong natural appetite for salt, both in men and animals; which, however, varies remarkably in different

<sup>1</sup> Chemical Composition of Chloride of Sodium:—

<i>Formula:</i> NaCl.	} Sodium . . . 23.3	} 58.8=1 equiv. chloride of sodium.

individuals. From the fact of the almost universal desire for it which exists, we cannot suppose that it is, *per se*, ever noxious, unless it be ingested in enormous and unnatural quantities; or unless, through other influences, the proper balance of its proportions in the blood be permanently or for a long time disturbed.

The valuable experiments of Barral,<sup>1</sup> Regnault, and Reiset, alluded to by Dr. Bird, Dr. Thudichum, and others, led to the conclusion that the elimination of the nitrogenized elements of the urine was facilitated by the action of the chloride of sodium. Dr. Thudichum thinks that if equally careful experiments were again conducted "by the more accurate methods" now at our command, we should acquire very important information in respect to the "causes and influences" which determine and modify the amount of chlorine thrown off by the kidneys; and this especially if the feces and other *excreta* were taken into the calculation. Barral ascertained by his experiments, both the whole quantity of chlorine taken with the food, and also that of chlorine and urea excreted. The action of chloride of sodium is certainly salutary also in another way; and which is particularly pointed out by Dr. Thudichum, viz., by its causing thirst, and consequently inducing the ingestion of an increased quantity of water, the diuretic influence of which, by producing a more copious urinary flow, "carries away not only the salt, but also organic ingredients in solution." (*Op. cit.*, p. 165.)

*The Relation of Chlorine to Pneumonia and other Acute Diseases.*—The very striking fact of the rapid diminution, and occasional temporary disappearance of the *chlorides* in the urine of pneumonic patients—first pointed out by Simon and Redtenbacher, and subsequently sedulously tested by several observers, amongst whom Dr. J. H. Bennett may be named as having supplied us with a large amount of clinical observation—naturally arrested the attention of pathological chemists and medical practitioners. It was at first supposed that the above-mentioned diminution was distinctive of the pneumonic inflammation; but subsequent researches seem to preclude this idea. Dr. Thudichum has lately announced the following proposition relative to this point: "The result of many observations of Vogel and others, last, of myself, then, is that *in all acute febrile diseases the amount of chlorine discharged in the urine sinks rapidly to a minimum, say one hundredth part of the quantity normal to the individual, until at last, in certain cases, it disappears entirely for a short time. When the diseased action is abating, the amount of the chlorides rises during convalescence, sometimes above the normal average.*" (*Op. cit.*, pp. 165–6.)

While, therefore, this diminution in and temporary disappearance of the

<sup>1</sup> Barral, S. A., "*Statique chimique des Animaux, appliquée spécialement à la question du sel*," Paris, 1850. (Thudichum.)

chlorine is not found to be solely characteristic of pneumonia, the cases of that disease in which it has been observed afford very striking illustrations of the fact. For detailed accounts of these, the recent work of Dr. Bennett, already referred to, may be consulted with great advantage. Dr. Beale, of London, has also given us much reliable information upon this important topic. (See *Medico-Chirurgical Transactions*, vol. xxxv.) The rule in pneumonia seems to be that the diminution of the chlorides indicates the progressive stage of the disease; at its height, the chlorides may wholly disappear; their reappearance is a sign of improvement, with cessation of the inflammatory action, and occurrence of the *crepitus redux*. Dr. Bennett thinks it established that, although absence of the chlorides may be found to exist in some other diseases, and may thus lessen the value of the sign in pneumonia, it yet leaves it unaffected in importance, "as pointing out the onward progress of that disease." (*Op. cit.*, p. 640.) The appearance of the chloride of sodium—thus excluded from the urine of pneumonic patients—in the *sputa*, and its desertion of the sputa when it again becomes manifest in the urine, is another remarkable fact connected with these observations. Experiments conducted by Mr. Seymour, Clinical Clerk, upon more than sixty pneumonic patients in Dr. Bennett's wards, established the fact that the chlorides were absent in all but one; and that was a case of phthisis, with *intercurrent* pneumonia.

The question to which we now recur, is virtually that at the foundation of our present researches, viz., *does any morbid action result from the retention of the chlorides in the blood?* Irrespective of what we have already said of the avidity with which the chloride of sodium is sought by man and animals, and its innocent nature unless inordinately ingested—when, indeed, it would in all probability be either vomited or discharged from the bowels—we learn from chemical and medical authority that the blood always retains a portion of the chlorides. The fact of the chlorides being found in large quantity in pneumonic sputa, is explained on this ground by Dr. Thudichum, viz., that sputa being, in part at least, "extravasations and exudations from the blood," the chlorides would naturally appear in a substance partly composed of exuded and "stagnant" blood. It does not seem, then, from all that we can discover is as yet known, and considered as material from which to draw conclusions, that pneumonia, or the other diseases in which the absence of the chlorides from the urine is remarked as a feature, can be distinctly ascribed to that fact as a prime cause. Were this to be predicated of any one affection, however, it would certainly be of pneumonia. An extensive field is open for important and interesting observations in the direction of the present inquiry; but should it be hereafter ascertained that the amounts of chlorine absent from the urine, and therefore presumed to be circulating in the blood, are to be considered as more or less poisonous, either by their quantity or quality, we still must remember, in estimating such an action, that there are other channels of

excretion open, by which a portion of the chlorine is excreted. The constant occurrence of diminution or abolition of the chlorides in pneumonia, is a curious and important fact; but, as yet, not sufficiently illustrated by observations and study, to take the place of an etiological element of disease. Dr. Thudichum states, in respect to the questions under consideration, "the absence of the chlorides in the urine does not necessarily involve the absence of chlorine from exudations. For the latter are products of diseased action derived directly from stagnant blood, and certainly not subject to the specific laws of secretion. The presence of chlorine in sputa, therefore, at a time when it is absent from the urine, is not sufficient proof of a determination of the chloride towards the inflamed lung; a proposition which, moreover, loses all probability from the partial or total disappearance from the urine of the chloride in all acute diseases." (*Op. cit.*, p. 166.) He then enumerates bronchitis, typhus, acute rheumatism, pyæmia, and pleuritis, as examples of this fact; and also refers to the influence exerted in the system by varying quantities of chlorine introduced into it with the food, ascribing no inconsiderable amount of this effect to the sort of diet used by the patient when the quantity of chlorine in "pathological urine" is to be estimated. In most acute diseases, it is known that patients take but little food—often none—and that the articles they eat are often unsalted. Another fact of consequence, which is insisted on by Dr. Thudichum, is, "that urine containing no appreciable trace of chlorine is secreted from blood containing a certain amount of it; from which it follows that the composition of the blood is such as not to allow any further removal of chlorine, or that the kidneys have lost their secretory activity as regards chlorine, as well as (which has been seen to be the case) with reference to water." (p. 167.)

As has been shown to be the fact with regard to pneumonia, so it may, in the opinion of the latter writer and others (and it is no less deducible analogically), be considered available to esteem the amount of chlorine in the urine, a gauge of the amount of morbid action going on in the system in certain other affections. That is, an estimate, more or less accurate, may be made as to the *severity* and *activity* of the disease. The minimum of chlorine in the urine, in making such estimates, Dr. Thudichum places at 0.5 gramme; and after that, in the intensity of the disorder it may, as we have seen, be altogether wanting. "This may be the combined effect of an entire loss of appetite, copious serous diarrhœa, or other serous exudations; of secretions, such as perspirations; and of the want of secreting power of the kidneys. A rise in the amount of chlorine, on the other hand, indicates a steady abatement of the acuteness of the disease, and is a good measure of the returning appetite and improved digestive powers of the patient."

We referred, previously, to the experiments of Barral and others, which seemed to show increased activity of nitrogenous elimination through the

agency of chloride of sodium. Dr. Golding Bird remarks, in this connection, that it would seem that this chloride, "besides furnishing hydrochloric acid to the stomach, and soda to the bile, also exerts an important physiological influence in aiding the metamorphosis of tissue, and consequent depuration of the blood." (*Op. cit.*, p. 127.) If we accept this as true, we not only need not ascribe any morbid effects to the retention of chlorine—or of chloride of sodium—in the blood, but rather deem its presence desirable and salutary—at all events, in the vast majority of cases.

Certain of Hegar's conclusions, which were arrived at under the superintendence of Liebig and Vogel (G. Bird), are interesting in this connection. We select a few, in illustration:—

"The amount [of chlorine in the urine] varied in different individuals, depending partly on the food, and partly on habit of life and constitution." "It was increased by exercise and copious draughts of water, which appeared to act by washing it out of the system, as the augmentation was only temporary." "Indisposition diminished the quantity." "In health, though no chlorides were taken with the food, they were always found, and must therefore have been obtained from the blood or tissues." "When a larger quantity was taken than usual, the whole did not escape from the system by the kidneys, nor even the bowels."

The latter two facts would seem to go far to prove the innocuousness of even considerable amounts of chlorine in the blood. Dr. Day (*Contributions to Urology*) is quoted by Dr. Bird as testifying to the fact to which we have previously called attention; that the chlorides are diminished in all cases of disease accompanied by copious exudation from the blood.

We notice that Dr. Bird asserts, as from Dr. Beale, that the nature of the diet necessarily adopted in pneumonia and other acute diseases, seems insufficient to explain the absence of the chlorides from the urine. Doubtless this default of ingestion of chlorine will not fully meet the requirements of the case in the way of explanation, but it seems only reasonable to allow it no inconsiderable weight. The following are Dr. Beale's very important propositions:—

"1. That chloride of sodium is totally absent from the urine of pneumonic patients at the period of complete hepatization of the lung.

"2. The chloride reappears after the resolution of the inflammation.

"3. The chloride exists in the blood in the largest quantity, when most abundant in the urine, and *vice versa*. [We may here, again, find reason for inferring the harmlessness of even large quantities of chloride of sodium in the blood; for when it is considered that under these circumstances, *were it easily, or at all, a cause of disease*, the conditions for the development of morbid action abundantly exist, we certainly have sufficient ground for the above opinion.]

"4. The chloride exists in very large quantity in the sputa of pneumonic patients.

"5. There is reason to believe

nia the chloride is determined



towards the inflamed lung, and is re-absorbed and removed on the resolution of the inflammation."

The validity of this latter proposition, as we have previously stated, is denied by Dr. Thudichum; and if it is meant thereby, as it would seem to imply, that the chloride of sodium is the morbid material, we cannot see any sufficient reason to suppose such a relation of cause and effect as by any means certain. That there is a degree of plausibility about it, we confess; but not, at present, any satisfactory proof.

In chronic diseases, the amount of chlorine excreted is usually diminished. This would tend to ratify the supposition that failure of the appetite, and the consequent less ingestion of food, explain the decrease in the chlorine introduced into the system; and the fact consorts, also, with the enfeebled nutrition. Lecanu found the quantity of chloride of sodium very small in the urine of women and old men (*Simon's Chemistry*, vol. ii. p. 167. Sydenham Society's edition.) Observers point out *diabetes insipidus* as an exception to this rule; the chlorine discharged being in excess. So, in dropsy, Vogel found the chlorine increased under artificial diuresis. Chlorine here becomes a gauge of the powers of digestion. It may be inferred that digestion is in good order, when from six to ten grammes are excreted in twenty-four hours; any quantity below five grammes, for the same period, declares an impaired nutrition, unless the diminution can justly be ascribed to a diet very deficient in chlorine, or entirely without any. So those discharges which diminish the amount of chlorine contained in the blood, "as serous diarrhœa, exudations and perspirations," should be taken into account in making an estimate of the morbid action. When the amount of chlorine is very largely increased, and there has been no corresponding plentiful supply by ingestion, *diabetes insipidus* may be inferred. "In dropsical and hydræmic conditions, an increase of the amount of chlorine is a favourable symptom." (Vogel, by Thudichum, *op. cit.*, p. 168.)

If this portion of our subject seems to have been presented in a somewhat negative manner, it is because the information attainable in reference to it is of the same nature. We seem able to say rather wherein the presence of chlorine in the blood—at all events of such amounts as are derivable from diverted excretion thereof by the kidneys—is harmless or even beneficial. Notwithstanding, it must be confessed, that observations and researches upon this point are not available in such quantity as to enable any one, at present, to set forth entirely reliable practical rules and conclusions.

SULPHURIC ACID. (Formula:  $\text{SO}_3 + \text{HO}^1$ : Equivalent, 16.0 Sulphur; 24.0 Oxygen=40.0, Sulphuric Acid.)

A variable, and often very considerable amount of sulphuric acid is dis-

<sup>1</sup> "Being the hydrate of sulphuric acid." (Thudichum, *op. cit.*)

charged from the body by the kidneys during each twenty-four hours. When it is considered that sulphur must nearly always exist in the blood, in greater or less amount—being derived from the food—it will be conceded that it is unlikely that any retention of it therein, even after its oxidation, unless it be present in very large and improbable quantities, would be influential in inducing actual disease. We will examine the known relations of sulphuric acid, as contained in the urine, to the system—so far as facts enable us to present anything worthy of credence and likely to prove of service.

Liebig, referring to Wöhler's experiments, ascribes the sulphuric acid generated in the system, to the action of the oxygen of the atmosphere upon the sulphur introduced into the blood through the medium of food—and this is particularly true of the albuminous portion thereof, which, of course, constitutes, as a general thing, a large amount of the whole. This process of oxidation, and consequent manufacture of sulphuric acid in the system, carried on as it is through the medium of the blood itself, seems to confirm our previously announced opinion, that this acid, in itself, is innocuous. If a very large amount were long and habitually retained in the circulation, it will be easy to understand that mischief might ensue. Before examining any possible or probable pathological issues, we will further allude to certain physiological facts connected with the existence of sulphuric acid in the system, and its excretion from it. It should be said, before proceeding further, that the oxidizing process above mentioned accounts for the surplus of sulphuric acid which is eliminated from the body, over and above what is ingested with the food, in the form of sulphates. (Liebig, Simon, Thudichum.) It is therefore evident that a full animal diet will, by introducing more sulphur into the blood, increase the amount of sulphuric acid in the urine—and that, under the same conditions, more must, for a time at least, be contained in the blood. The experiments of Lehmann on himself show conclusively the effect of different sorts of diet in increasing or diminishing the quantity of sulphuric acid passed in the urine. Thus, while on a "mixed" diet, 7.026 grammes of the acid were collected during twenty-four hours; when animal food was exclusively used, the quantity rose to 10.399 grammes in the same time; when living on vegetables exclusively, only 5.846 grammes were obtainable in the course of one day. Dr. Thudichum, commenting upon these quantities, pronounces them very high, and is inclined to attribute this to Lehmann's appetite. He was, it is true, in fine health and of robust constitution, and therefore some allowance is to be made; but, as Dr. Thudichum also implies, the intrinsic value of the experiments is unaltered by the mere amounts. The *ratio* of formation of the acid, under the differing influences, is the essential point. Certain very conclusive experiments by Vogel, Clare, and others upon this subject, are given in some detail in the work of Dr. Thudichum. The results are the same in character as those obtained by Lehmann.

There exists, as yet, no test or other means of revelation, so far as we are aware, which can inform us what amount of sulphuric acid may be required by the system in its different states. We know the beneficial effects derived from its medicinal use as a tonic, refrigerant and astringent; and thus it would appear that in certain states of the constitution it is especially suitable—we may, indeed, say indicated. Whether a certain amount of the sulphates must enter into the circulation in order to perfect secretion, “or whether sulphates may be retained and accumulated in the economy,” is, at present, unknown. Dr. Thudichum, while stating this fact, mentions that neither rest, nor activity, nor the ingestion of large quantities of water, seemed materially to affect the amounts of sulphuric acid in the urine, in certain of the experiments of Clare and Gruner. Vogel, however, he states, believed “it probable that such influences exist, that the secretory activity for sulphuric acid is dependent upon certain individual and cosmic influences” (*op. cit.*, p. 175); and this is rendered nearly certain by the fact of the difference in the rapidity of oxidation of the introduced sulphur observed in various persons. A very significant opinion of Vogel, quoted by Dr. Thudichum, is of importance as affording a valuable suggestion closely connected with our present inquiries, and in respect to which we need more extended observation. It will be seen, as we just remarked, that the suggestion bears directly upon the point which now engages our attention; and all inquiries of this nature must tend greatly to advance our knowledge of any diseased conditions (and of the remedial measures suited to them) which may reasonably be supposed to depend, even remotely, upon an undue accumulation of the products we are considering, in the blood. The statement to which we have reference is as follows:—

“Vogel, also, from observation, is of opinion that the prolonged use of sulphates in digestive doses is decidedly weakening, and believes it probable that this depressing action may be due to an accumulation of the salts in the system. When to this it is added that sulphate of soda in larger doses is an emetic, and sulphate of potash a poison, the question as to the influence of sulphuric acid and sulphates in the urine becomes one of sufficient importance to fix the attention of future inquirers.” (*Loc. cit.*, p. 176.)

From the same sources of authority we learn that the amount of sulphuric acid in the urine is diminished in febrile diseases. This, as is plausibly suggested, may, in great measure, be ascribable to the nature of the food taken, viz., mainly vegetable—less sulphur being thus supplied to the blood; and it must also be remembered that the *quantity* of food is very greatly diminished under such disordered conditions.

Dr. H. Bence Jones (*Medico-Chirurgical Transactions*, vol. xxxiv.) found the amount of the sulphates increased in *chorea*, and in aggravated cases of *delirium tremens*; and he likewise notes a similar augmentation, both of the sulphates and phosphates, in cerebral inflammation. He ascribes this occurrence to the rapid disintegration of muscular tissue in the former

affections, and to excessive and rapid oxidation of the cerebral substance in the latter.

Vogel found, in three pneumonic patients, the amount of sulphuric acid discharged, exceptionally, "above the normal average." In chronic diseases, while the quantity was variable, it was generally below the standard amount. It was not increased under a diuretic action which largely augmented the discharge of the chlorides, as in cases of dropsy. The ingestion of sulphuric acid and sulphates by patients labouring under chronic disease, alone produced any increase in the amount excreted; and a hearty meal of animal food had the same effect in patients suffering from diabetes.

While we are obliged to speak doubtfully as to any abnormal effects ascribable to the action of various amounts of sulphuric acid retained in the circulation, we can say—as we have already once stated—that such effects, from any increased amount likely to be thrown into the blood by failure of the renal excretory function devoted to separating this acid, are not such as to be defined, with our present knowledge; nor can we believe any very serious results likely to follow under such circumstances. If *all* the urinary elements were retained, or only such as greatly predominate—and which we have previously considered—then the other accidents, already detailed, would very surely mask any minor morbid action; and if either urea or uric acid predominated, we should have their peculiar concomitant or resulting phenomena, to the exclusion of any weaker manifestations. While, therefore, nothing positive can be charged to the presence of sulphuric acid in excess (more or less) in the system, we are fortunate in having suggestions from reliable sources, and accurate chemical observations from many competent hands. And all will join Dr. Thudichum in estimating very highly the determination of the quantity of this acid in the urine as being a sort of index of "the amount of disintegration of albuminous matters in the system, in cases where the ingestion of sulphur in any form or combination is very low or altogether suspended." He goes on, also, to remark that possibly a degree of correspondence of the acid with urea, in amount, might be found to exist, "supposing their inclination to pass the kidneys to be equally great. But upon this point there are yet doubts." (p. 177.) If both sulphuric acid and urea be largely excreted, we are to infer that very free oxidation is going on in the system, and is due to the ingestion of animal food in abundance. The opposite condition with respect to sulphuric acid, would go to show a diminution in, or entire deprivation of animal and vegetable food. These states may be either constant or accidental. (Thudichum.) We have already hinted that a sudden, temporary increase in the amount of sulphuric acid excreted, would seem to indicate a reception of sulphur, in some of its forms, into the system, and that too in large quantity.

Dr. Thudichum thinks that new analyses of the blood will have to be made, and without incinerating it. This, he states, "destroys the relative

proportions of acids and bases in the salts of the alkalis." We may thus hope not only for more accurate chemical information upon these points, but also that new and more abundant pathological inferences will be drawn from such researches. The fact that the production of sulphuric acid is proved, to all appearance, to be restricted to the blood, and that it is formed through the agency of the oxygen of the air, by means of the respiratory function, is highly important in relation to the present portion of our subject. Its being formed, in great measure, in the blood, is favourable to the idea we have before mentioned, viz., that the vital fluid will be more likely to tolerate its presence, even in large quantities. If this opinion should be deemed merely speculative, we can only say that most of the information now existing upon the subject is of the same nature.

Another interesting question, founded upon the seeming fact that the sulphuric acid is in great part formed in the blood, from the aliments—and also referring to the remark by Liebig, "that the acid nature of the urine of carnivorous animals, as well as that of men, depends upon the nature of the bases partaken of in the aliments, and upon the particular form of their combination"—is, how far the office of the kidneys is to finish the "final oxidation, or that stage of disintegration of albuminous matter in which sulphur, in the form of sulphuric acid, leaves the organic combination, joins a base, and appears in the urine." (Thudichum, *op. cit.*, p. 178.) These, and other chemico-pathological inquiries, as has already been intimated, must be left to future investigators to determine. So far as our present means afford us any ground for the pathological inferences connected with this portion of our subject, we are compelled—after having presented what, for the greater part, is as yet conjectural and undetermined, although seemingly interspersed with the elements of truth, and certainly accompanied by many precise chemical facts—to rest the matter here.

#### PHOSPHORIC ACID.—(Formula : $\text{PO}_5 + 3\text{HO}$ .)<sup>1</sup>

This acid is the next regular constituent of the urine which we are to consider, pathologically. Previous to entering into any particulars, it may

<sup>1</sup> Liebig, quoted in Simon's Chemistry, vol. ii. p. 153. (Lancet, 1844.)

<sup>2</sup> "The common or tribasic phosphoric acid."

#### *Chemical Composition of Phosphoric Acid.*

1 equivalent phosphorus . . . . .	P=31.436
8 equivalents oxygen . . . . .	=64.000
3 equivalents hydrogen . . . . .	= 3.000
1 equivalent of phosphoric acid . . . . .	<hr/> =98.436

"The theory which assumes P to be a double atom, and the single atomic weight=15.718, uses  $\text{P}_2$  as the symbol for the above equivalent of phosphorus. This is an explanation to the reader, should he find himself embarrassed by the formulæ of different authors."—Thudichum.

be said that its position in relation to pathological states of the system; generally, very closely resembles that of sulphuric acid. We shall therefore treat of it in much the same manner as was adopted in examining the latter substance.

Phosphorus enters the system constantly, and often in very considerable quantities. It is taken with the food, and it has also been long medicinally ordered. Within a short time, indeed, the *phosphates* and *phosphites* of lime and soda have been prescribed with variable results, as *nervines*, and also as being suited to combat the ravages of tuberculous disease of the lungs. In certain cases, we may add, they are reported to have been of service; and we can recall cases of general prostration, and of what has been sometimes termed "nervous debility," in which we have used them with apparently marked benefit. To Dr. Churchill, now of Paris, belongs, we believe, the credit of suggesting their persevering employment in threatened, or actually existing, pulmonary consumption. The success attained, although flattering in many instances—as we learned, personally, not long since, in the French capital—has not, by any means, justified the expectations at first excited.

This seeming digression from the immediate course of our subject, is not, after all, an element actually foreign to its consideration; for we may thus at least be led to examine what cases will be likely to derive benefit from the ingestion of phosphorus into the system.

The amount of phosphoric acid present, normally, in the urine, is considerably less, according to Becquerel and Rodier, Golding Bird, Johnson, Prout and others, than that of sulphuric acid; and it is found in combination with lime, ammonia, soda, or magnesia. Dr. Thudichum, we notice, in his estimate in the table from which we have taken our list of urinary constituents, has made the amount greater. In the system generally, the quantities existing at different times, will vary from nearly the same causes as have been assigned for the changes in the quantity of sulphuric acid; viz., the nature and amount of the food taken, and the ingestion or otherwise, of phosphorus in a medicinal form. The same difference in rapidity of excretion of phosphoric acid, is observed in different persons, as is true with regard to sulphuric acid. And in respect to the activity and amount of excretion, the same variations are to be remarked as have been recorded for chlorine and sulphuric acid. Therefore, renal disease must be considered an important *pathological* influence in respect to the amounts excreted, as personal peculiarities and fortuitous circumstances as to diet, &c., are observed to be, *physiologically*. We learn from Vogel, that copious draughts of water will increase the amount of phosphoric acid excreted by the kidneys—a fact similar to what has been mentioned in respect to the chlorides. As Dr. Thudichum remarks, in commenting upon this point, and as we have previously intimated, "the organism may at one time contain an excess of phosphoric acid, at other times the acid may be deficient."

"It will, however," he adds, "be difficult fully to establish these points, until the normal amount of phosphoric acid contained in all parts of the body, and its changes and variations, within the range of perfect health, be known. And then the examinations will have to comprise a complete analysis of all food, and of all excretions." (*Op. cit.*, p. 188.)

The decrease of phosphoric acid in acute disease, noticed by Vogel, is ascribed partially, as was the fact with regard to sulphuric acid, to the *diminution* and *quality* of the diet ordered or made necessary. When the rations are richer and more liberal, the phosphoric acid increases in quantity; and in convalescence the normal amount is often exceeded, owing to the increased ingestion of food. The decrease of phosphoric acid bears a notable proportion to the *period of time* the illness lasts—even if the attack be violent, and much fever accompany. If short, there is little variation in the amount of acid excreted, and *vice versa*. Severity and prolongation of the disease, with great diminution of, or total abstinence from food, causes very marked decrease in the quantity of phosphoric acid appearing in the urine. In *chronic diseases*, no rule is observed. Sometimes, and indeed usually, there is great diminution in the amount, and again there may be excess.

Certain statistics supplied by Dr. Thudichum, relatively to the quantities of phosphoric acid excreted in various diseases, and at different stages of each affection, have an important bearing upon the subject. In a table given by him (*op. cit.*, p. 191), the most remarkable points, perhaps, are that the largest amount mentioned ("maximum") as excreted, was in the case of a *female* with diabetes insipidus (7.8 grammes); the next largest, in a *male*, suffering from *hydruria* (5.8 grammes). This seemingly ratifies the remarks and observations previously made, that where the kidneys are most actively employed, the most phosphoric acid is excreted.

If the question be now asked, whether there is any relation between the deficient excretion of the acid in question, and the diseases which have been specified as exhibiting less of the excreted product during their acute course—this implying the retention of a greater or less amount of the substance in the blood—we must admit that no positive proof of this absolute connection as yet exists. In this respect, as in many others pathologically important, the subject is very much in the position of the one last examined. We have already, incidentally, referred to the detection of an increased amount of the phosphates—in connection with the sulphates—in the urine of persons with cerebritis, by Dr. H. Bence Jones. This phenomenon, ascribed by that accomplished observer to rapid oxidation of the cerebral tissues, will, we conclude, hardly justify us in ascribing the inflammatory attack upon the brain, in any degree, to increase and undue retention of the phosphoric acid in the circulation. It does not appear, moreover, that the kidneys were at all disabled; had they been, it is not impossible but more serious mischief might have occurred in such cases—although it is

known that a portion of the phosphorus entering the system, goes off by the bowels, as well as from the kidneys.

### EARTHY PHOSPHATES.<sup>1</sup>

We have previously mentioned the medicinal use of the phosphates, with the purpose of adding to the nervous force, and in the hope of obviating tuberculous disease. The phosphates of lime and of soda have thus far been prominent in these respects. The latter is physiologically essential to the integrity of the blood and body.<sup>2</sup> (Liebig, Thudichum.) The proportion of earthy phosphates discharged daily is found to be very variable in different persons; and, according to the most reliable authorities, no average amount can yet be declared. Lehmann, when living upon a mixed diet, discharged, on the average, 1.09 grammes, daily; when his food was exclusively of an animal nature, the amount became 3.56.<sup>3</sup>

#### <sup>1</sup> Chemical Composition of the Phosphates.

Ammonio-phosphate of soda	$=\text{PO}_5 + \text{NaO} + \text{NH}_4\text{O} + \text{HO} + 8\text{HO}.$	$\left. \begin{array}{c} \text{Phosphates} \\ \text{of the} \\ \text{Alkalies,} \\ \text{and} \\ \text{Earths.} \end{array} \right\}$
Acid " " "	$=\text{PO}_5 + \text{NaO} + 2\text{HO}.$	
Ammonio-phosphate of magnesia	$=\text{PO}_5 + 2\text{MgO} + \text{NH}_4\text{O} + 12\text{HO}.$	
Phosphate of lime (acid),	$=\text{PO}_5 + 2\text{CaO} + \text{HO}.$	
Phosphate of magnesia,	$=\text{PO}_5 + 2\text{MgO} + \text{HO}.$	$\left. \begin{array}{c} \text{of the} \\ \text{Alkaline} \\ \text{Earths.} \end{array} \right\}$
Phosphate of soda . . . . .	$(\text{HO}, 2\text{NaO}, \text{P}_2\text{O}_5) + 24\text{HO}.$	$\left. \begin{array}{c} \text{Thudichum.} \end{array} \right\}$
Ammonio-phosphate of soda . . . . .	$(\text{HO}, \text{NH}_4\text{O}, \text{NaO}, \text{P}_2\text{O}_5) + 8\text{HO}.$	
Phosphate of lime . . . . .	$(\text{HO}, 2\text{CaO}, \text{P}_2\text{O}_5)$	
Ammonio-phosphate of magnesia . . . . .	$(\text{NH}_4\text{O}, 2\text{MgO}, \text{P}_2\text{O}_5) + 12\text{HO}.$	
Neutral phosphate of soda . . . . .	$(\text{HO}, 2\text{NaO}, \text{P}_2\text{O}_5) + 26\text{HO}.$	
Acid phosphate of soda . . . . .	$(12\text{HO}, \text{NaO}, \text{P}_2\text{O}_5) + 2\text{HO}.)$	

G. Bird.

Robin and Verdeil have pronounced the two salts, last described, to be normal constituents of the urine.

<sup>2</sup> "There is no known salt the chemical characters of which approach more closely to those of the serum of blood than the phosphate of soda; there is none more fitted for the absorption and entire removal from the organism of carbonic acid."—Liebig, *Researches on the Chemistry of Food, and the Motion of the Juices in the Animal Body*. Dr. Gregory's Translation, American edition, by Prof. E. N. Horsford, 1848.

<sup>3</sup> In connection with the presence of phosphoric acid and of chloride of sodium in the system, the following remarks of Liebig have an interest and importance: "In some pathological conditions there has been observed (Schmidt, *Annalen der Chemie und Pharmacie*, vol. lxi. p. 329), at points where bones and muscles meet, an accumulation of free lactic and phosphoric acid, which has never been perceived at those points in the normal state. The solution and removal of the phosphate of



*Pathologically*, the effect of the presence of an unusual amount of the earthy phosphates in the system, would depend very much upon the integrity of the kidneys. If the latter were disabled, and even if not particularly disorganized—sometimes, even, if nearly healthy—there might be large deposition of these substances in various parts of the urinary passages. The circulation would in this manner be freed from an embarrassing amount of them, but the morbid effects of such an abundant deposit would certainly prove very troublesome. Vesical calculi are rarely *entirely* composed of the phosphates. Such is their friable nature and tendency to a pulverulent condition, that they prefer a nucleus of some sort, around which to accrete, rather than to form pure aggregations of their own substance.

Dr. Thudichum believes that “the originators of the term phosphatic diathesis and phosphuria, and their followers, linked a series of the most varied disorders together under this term, which had nothing in common but one symptom, namely, alkaline urine.” (*Op. cit.*, p. 211.) He then proceeds to explain in a very clear manner, the reasons for a greater or less acidity or alkalinity of the urine. And alkalinity may thus be often due to a lack of animal food, by which a suitable amount of acid is usually supplied. Therefore the invalid and the poor man are alike liable to pass very alkaline urine—the dyspeptic from want of appetite, and the pauper from want of means. A vegetable or fruit diet, alone, will make the urine alkaline; and those who cannot digest, or imagine they cannot digest meat, and therefore try a vegetable diet, will almost certainly have alkaline urine. In anæmia, a meat-diet will soon produce an acid urine, with the phosphates, where no acidity existed before.

It would appear, then, so far as conclusions can at present be drawn, that a certain amount of phosphoric acid is not only physiologically necessary (*phosphate of soda*), but that certain states of the system require additional amounts medicinally, or by food. The ammoniacal urine of patients who labour under spinal disease or injury, or who are suffering from other affections giving rise to retention and stagnation of the urine, and its alkaline change, is referable to a local cause; and the mischief which undoubtedly results to the circulation by reason of this state of things, is

lime, and therefore the disappearance of the bones, is a consequence of this state. It is not improbable that the cause, or one of the causes of this separation of acid from the substance of the muscles is this—that the vessels which contain the fluid of the muscles have undergone a change whereby they lose the property of retaining within them the acid fluid they contain.

“The constant occurrence of chloride of sodium and phosphate of soda in the blood, and that of phosphate of potash and chloride of potassium in the juice of flesh, justify the assumption that both facts are altogether indispensable for the processes carried on in the blood and in the fluid of the muscles.” (*Op. sup. cit.*, p. 90.)

part and parcel of the causative disease. If inordinate quantities of the phosphates are passed for a long time, we should certainly look for systemic disorder; and doubtless the general health would soon be found to deteriorate. Some *specific* cause might be detected for such failure—unless an unusual quantity of phosphoric acid were being introduced into the system, to account both for the large corresponding excretion, and for unimpaired health—should the latter be observed to exist. But usually, with such a state of things, impaired nervous energy, dyspepsia with irritability, and various functional disturbances, will be present.

The extraordinary case reported by Dr. Golding Bird, of the man who passed very large quantities of the phosphate of lime, without apparent harm to his constitution (excepting that he was always dyspeptic), is believed by Dr. Thudichum to be an instance of imposture. There certainly seems to be some reason for so regarding it. The patient had been under the care “of half the hospital physicians and surgeons in London,” during fifty years. It is remarked that very possibly he might wish to be an object of permanent interest to whatever physician attended him, and that he liked hospital quarters. At one time he brought more than an ounce of the above-mentioned salt to Dr. Bird, and which he asserted was passed from himself. His urine was milky, and abundantly deposited the salt, as stated. It is not, however, impossible that he may have been even a longer time collecting the large quantity shown to Dr. Bird, than is suggested by Dr. Thudichum, viz., sixteen days. The man’s health was so good that no treatment seemed justifiable, except on account of an apprehension that a vesical calculus might form.<sup>1</sup> Dr. Thudichum does not think Dr. Bird’s explanation of the case founded on fact;<sup>2</sup> and he refers to Dr. Prout’s remarks upon this point, as follows:—

“If the reader should not share our doubts, he may adopt the explanation by Dr. G. Bird, for which, however, there is no basis in fact; or he may explain it upon the ground of the following observation recorded by Dr. Prout. (p. 323, note.) This physician examined the body of a gentleman who, during the greater part of his life, had suffered from renal disease, remarkable for being

<sup>1</sup> It would therefore seem that his *dyspeptic* symptoms were not very urgent.

<sup>2</sup> The following are Dr. Bird’s explanatory remarks: “In cases of this kind it is very possible that the phosphate of lime is secreted from the mucous membrane of the bladder, and not derived from the urine. All mucous secretions contain phosphoric acid, combined with earthy bases; and hence if an excess of the latter is secreted with the vesical mucus, it may be washed away with the urine and form a deposit. This is by no means unfrequent in the irritable bladder, depending on the existence of prostatic diseases, &c.: we have a perfect analogy to this in the calculous concretions found in the ducts of glands furnishing mucous secretions. These are all prone to secrete phosphates in too great an excess to be washed away with the secretion; they are therefore retained and form a calculus. These, from whatever part of the body they are obtained, present nearly the same composition.” (*Urinary Deposits*. Dr. Birkett’s edition, 1857, p. 306.)

attended by the secretion of large quantities of the earthy phosphates. Both kidneys were not only extensively disorganized, but most of the natural cavities, as well as many cysts, were found distended with numerous earthy concretions, of various sizes and composition. The concretions found in those cavities *to which the urine had access*, consisted of the phosphate and carbonate of lime, and more or less of the triple phosphate of ammonia and magnesia, while those cavities or cysts distinct from the renal structure, and to which, therefore, *the urine had no access*, consisted of the calcareous phosphate and carbonate only, without any admixture of the triple phosphate." (*Op. cit.*, p. 213.)

When what is termed the "phosphatic diathesis" exists, or when we find copious phosphatic deposits in the urine, we are to expect in such patients a state of debility, listlessness and exhaustion, mental and physical—a sort of cachexia, with disturbed digestion, and an irritable state of the digestive organs; and also, either some manifest or concealed disorder of the nervous system. To this condition we have already referred. Such symptoms should lead to the adoption of an alterative and tonic treatment, and to such examination of the patient hygienically and constitutionally, as will doubtless soon afford a knowledge of the chief source of difficulty—whether functional or systemic; and if the latter, whether the cerebro-spinal, or renal organs are at fault; or whether the blood itself be surcharged with matters fit only for elimination. Old people often exhibit a train of symptoms indicating troubles referable to what is styled "the phosphatic diathesis." Dr. Bird well describes the state when he writes that there "is irritability with depression, a kind of erethism of the nervous system, if the expression be permitted, like that observed after considerable losses of blood."

It seems peculiarly appropriate to introduce in this place the conclusions of Dr. H. Bence Jones in reference to the pathological bearing of phosphatic salts in the economy—much of what we have previously said seems to find ratification in these opinions, and perhaps we could not better conclude our examination of this department of our subject than by presenting them.

"1. No determination of an excessive secretion of phosphoric acid can be afforded by the deposit of earthy salts, unless the quantity of lime and magnesia in the food be taken into account.

"2. No *real increase* of phosphatic salts occurs in spinal diseases, notwithstanding the existence of deposits.

"3. In fever, and in most acute inflammations, the phosphatic salts are not increased.

"4. In old cases of mania, melancholy, paralysis of the insane, or in chronic cases of disease in which nervous tissues are uninfluenced, no conclusions can be drawn.

"5. In fractures of the skull the phosphatic salts increase only when any inflammatory action occurs in the brain, and in acute phrenitis an excessive increase takes place.

"6. In delirium tremens there is a marked deficiency of phosphates unless they are introduced with the ingesta; an excess is, however, met with in some functional affections of the brain."<sup>1</sup>

In this connection, we cannot but allude to the zealous, and, as it would seem, very sensible, recommendation, by Dr. Bird, of what he appropriately terms "renal depurants." Knowing, as we do, from unmistakable symptoms, that a poisonous substance is traversing the blood, and thus pervading all the bodily tissues, it is our manifest duty to use some such means for stimulating a sluggish, or even a partially diseased kidney, to freer elimination. And there are many substances which may be effectually employed in this manner, and innocuously, or even beneficially to the kidneys themselves. Indeed, when there is even some degree of risk in demanding extra work from those organs, it is better to tax them rather severely, than to allow the accumulation of morbid matters, of any kind, in the blood. "The alkalies, their carbonates, and their salts, with such acids as in the animal economy are capable of being converted into carbonic acid, including the acetates, tartrates, citrates of soda and potass," are properly "renal depurants." (Bird, *Op. cit.*, p. 452.)

AMMONIA.—Symbol:  $\text{NH}_3$ ; Equivalent, 17.0.<sup>2</sup>

Ammonia exists in comparatively very small proportions in fresh and healthy urine.<sup>3</sup> Liebig, indeed, doubts whether it can indubitably be pronounced an invariable and constant constituent of normal urine. In these doubts he is joined by Lehmann and Scherer. Dr. Thudichum, who has investigated the subject in his treatise already largely referred to, thinks the researches of Boussingault more satisfactory than those of Bœcker and De Vry; and that they tend to show the presence of this substance in the urine. Neubauer (*Journal für Practische Chemie*, Bd. 64, p. 177, and *Anleitung*, § 56), according to the same writer, has afforded the best proof, thus far, of the presence of certain amounts of ammonia in the

<sup>1</sup> We transcribe these statements as given in Dr. Bird's volume; consulting at the same time Dr. Jones's papers on the Sulphates and Phosphates, contained in the 30th and 34th volumes of the Medico-Chirurgical Society's Transactions.

<sup>2</sup> *Chemical Composition of Ammonia.*

$\text{H}_3 =$	3.0	17.65
$\text{N} =$	14.0	82.35
	<hr/>	<hr/>
	17.0	100.00

*Thudichum.*

<sup>3</sup> Ammonia "is the only volatile alkali with which chemistry is acquainted; and of this property we avail ourselves for its analysis."

"*Demonstration of the presence of Ammonia in Urine.*—The ammonia, which has been liberated from urine by means of milk of lime, is made to pass in the form of gas into a solution of sulphate of silver and arsenious acid; the precipitate ensuing is evidence of its presence." (*Thudichum.*)

urine. His analyses were made by the method of Schlösing. In regard to this process, Dr. Thudichum remarks: "There is only one objection to this method, which I have already advanced; the ammonia is set free by the addition to the urine of milk of lime. Now, if it can be proved that milk of lime, at the ordinary temperature of the air does not within a reasonable limit of time create ammonia from urea and the other organic substances, we are bound to say that an essential progress would be effected by these researches of Neubauer. The subject of ammonia in connection with the animal economy would be of immense importance, if it should be proved beyond the shadow of a doubt, what Dr. Richardson (Astley Cooper, Prize Essay for 1856, On the Cause of the Coagulation of the Blood) has endeavoured to show, namely, that ammonia is a regular constituent of the blood, and the solvent of fibrin in the living body." (pp. 219, 220.)

According to the same author—who again refers to Neubauer's analyses for the proof of the assertion—"The ammonia of the salts of ammonia, when the latter are taken into the stomach, passes unchanged through the system and is discharged in the urine." (p. 223.)

We have cited the above facts—principally of a chemical and physiological nature—because they are not only interesting, but also have an important relation to the pathological question which presents itself in regard to ammonia considered as a constituent of the urine; and whether its retention in the blood produces any morbid effects. We have not very much to offer upon this portion of the subject; but there are some considerations which are significant. There is a great deal to be learned in regard to the matter—to say nothing of the points in dispute—and principally in reference to the production of uræmia through the agency of *carbonate of ammonia*, as a product of fermentation in the blood. Upon this latter question we have already entered into extensive detail, and have endeavoured to present the actual *status* of the subject, as viewed by many celebrated and industrious observers. We refer the reader to the portion of this essay devoted to *Uræmia*; and will merely add, that all who have examined the facts and theories advanced by Frerichs and others relative to uræmic poisoning, acknowledge the importance of the investigations, and also seem fully aware of the conspicuous position which ammonia would assume as a morbid agent in the human system, if it should ever be proved to possess such a toxic influence as some now accord to it. Dr. Thudichum remarks upon this point: "If what some have ventured to bring forward as a defined feature of certain forms of disease of the kidney can really be maintained, namely, that the urea retained in the blood may there undergo decomposition into carbonate of ammonia, and give rise to the symptoms described as uræmia, the pathological indications of ammonia in the urine would be all-important in those diseases. And though quantities of ammonia might be excreted by the lungs, skin, and bowels, yet the

urine would be that excretion in which the ammonia would be most accessible. However probable such a process, under given circumstances, may be, actual and direct proof would be required to make it a fact; and this we cannot say to have been afforded by the originators of the theory. We know, on the contrary, that the test said to be diagnostic of the presence of ammonia in the breath, the formation of white vapours on contact of the breath with a glass rod dipped in hydrochloric acid, frequently fails in cases with the most marked symptoms of uræmia. We must, therefore, expect further proofs, analyses of the blood and the excretions, before we can give that extension to toxæmia as a cause of various severe affections, which by various authors has been attributed to it. It is the same with putrid or septic fevers, under those conditions in which the blood is said to be in a state of dissolution. For all we know, ammonia may be a product of these pathological processes; and then we might expect to find it, in part at least, in the urine." (*Op. cit.*, pp. 224, 225.)

The opinion of M. Claude Bernard, in his late work (*Leçons sur les Propriétés Physiologiques et les Alterations Pathologiques des Liquides de l'Organisme*, Paris, Baillière, 1859), is adverse to admitting that carbonate of ammonia is capable of producing toxæmia. We have referred to this opinion more at length in another place. (See Appendix, Note A.)

The small quantity of ammonia entering into the composition of the normal urine, is, of itself, an element which rather tends to preclude the idea of its accumulating in the blood—in cases of retention of the urinary ingredients—in such quantities as to prove noxious, even if we consider it to be a toxic agent. At all events, under such a supposition, it would require a considerable time for bad effects to arise. And even granting all these conditions, the phenomena springing from retention of the other more abundant constituents would preponderate; unless, by that sort of "elective affinity" previously spoken of, ammonia alone were seized upon and retained in the circulation—the other matters being eliminated and excreted.

Again, it is by no means impossible, although not definitely proved, that ammonia may be essential to the integrity of the blood; in which case, any pathological inferences from its presence, unless occurring in very large and improbable quantities, could hardly be drawn. And especially in view of the fact that the nature of that ferment supposed by Frerichs to be necessary for the production of carbonate of ammonia from urea contained in the blood, is yet unknown, must doubt envelop the whole question, pathologically, until further experiments shall be made, and its existence and real character be ascertained, or its nonentity determined.

In respect to the question as to the necessity of ammonia to the proper constitution and healthy condition of the blood, Dr. Thudichum has some remarks which, under cover of a little pleasant facetiousness, contain

valuable hints, and may be appropriately introduced in this connection. Speaking of the elimination of ammonia—ingested into the system in an unchanged state—by the kidneys, he says :—

“It remains to be seen whether caustic ammonia and carbonate of ammonia are eliminated in a similar manner. It remains, also, to be ascertained whether the organism produces any ammonia under ordinary circumstances, or whether the ammonia in the urine is simply introduced by our food and drink, or by the air which we breathe. Some articles of food are rich in ammonia, *e. g.*, radishes. The smoke of tobacco contains a large share of ammonia; and any person remaining for any length of time in a room filled with this ambrosial offering to Apollo, must inhale such quantities of ammonia as must materially increase the ordinary amount in his urine. If ammonia be really essential to the blood, the anti-tobacco leaguers may yet hear the argument advanced, that tobacco-smoking is really essential to keep our fibrine in solution, and that smoking has of late become so much more common because the ordinary sources of this ‘food,’ the cesspools, dunghills, and other like accompaniments of human and animal habitations, have been done away with. A still greater amount of ammonia is of necessity inhaled where both the sources just mentioned flow without restraint.” (*Op. cit.*, p. 224.)

The fibrine in the blood of a very considerable proportion of the population of America ought to be in a good state of “solution” if the smoking of tobacco be in any degree conducive thereto! Let us hope that such is the effect of “the weed,” *via* combustion and inhalation!

Several observers have stated the very small amount of ammonia which can be ascertained to exist in healthy urine.<sup>1</sup> Simon (*Chemistry*, Syd. Soc. edit., vol. ii. p. 132) says it “cannot be very easily demonstrated in healthy urine.” Liebig (*Lancet*, 1844), referred to by Dr. Day, Editor of *Simon’s Chemistry* (*loc. cit.*), pronounced the presence of ready formed ammonia in the urine, as only indicated by “very minute or doubtful traces;” and stated also that “these traces probably pre-existed in the food partaken of.” Dr. Day subsequently remarks: “Experiments for the determination of the amount of ammonia in the urine of healthy individuals may become of importance in judging of pathological states; for in fevers and other diseases, the amount of ammonia in the urine increases considerably. It is possible that by analyzing the urine we may, in the increasing or decreasing amount of ammonia, obtain a measure for the alterations which take place in diseases.”

As has been previously remarked, there seems not to be a sufficient amount of evidence from which to educe satisfactory conclusions relative to any pathological influence ammonia may have upon the system when present therein in unusual quantity. Those who attach such a distinct power to it in the production of uræmic intoxication and eclampsia, have yet to

<sup>1</sup> “Ammonia exists only in the urine in combination with the muriatic, phosphoric, and lithic acids.” (Prout, *op. cit.*, p. 555.)

procure and offer much additional evidence, before their doctrines can be unhesitatingly and fully accepted. The preliminary structure certainly has a fair and plausible appearance, but needs full development and confirmation. We have endeavoured to present whatever is available and reliable upon the present topic, so far as our means of information permit.

The examination of the relations of ammonia to the urine and the blood concludes the plan originally proposed by us in discussing the subject under consideration. It occurs to us, however, that a few words may appropriately be added relative to the *iron* and the *colouring matter* of the urine—*uræmatine*. These we will briefly notice under one head.

#### IRON AND URÆMATINE.<sup>1</sup>

Iron and uræmatine exist normally together in combination<sup>2</sup> in the urine. Of course, variable amounts of iron must be found at different times in the system, according to the nature and amount of the ingesta; and as the mineral in some of its various medicinal forms is very extensively used, there must be in many persons a large quantity introduced into the circulation.<sup>3</sup> We know the marked beneficial effect of this medication in a large class of cases, especially in those of an anæmic and chlorotic character, and its employment was doubtless owing, first and mainly, to the knowledge of the fact that iron is a normal constituent of the blood. That portion of the vital fluid of which it is an integral part, is, as is well known, the *hæmatine* or red colouring matter. Chemists have been inclined to believe uræmatine “a derivate” of hæmatine, so great is its resemblance to it. (Thudichum *et al.*)

But little that is positive can be said upon this subject, as to any pathological deductions. We can hardly conceive of a sufficient quantity of iron being accumulated and retained in the blood—if derived merely from the amounts contained in the urine—to prove injurious. It is not infrequently observed in practice, that only certain quantities of iron can be medicinally ingested, without giving rise to headache, fulness and turgidity of the bloodvessels, with other disagreeable symptoms, principally of a plethoric

<sup>1</sup> *Iron*: Symbol; Fe. Equivalent; 28.0.

*Uræmatine*: Elementary composition unknown.

*Thudichum.*

<sup>2</sup> Harley; cited by Thudichum.

<sup>3</sup> Notwithstanding that iron is frequently thus largely ingested, it is a curious and hitherto unexplained fact, that it is not found in the liquid excreta. Its mode of elimination is therefore unknown. Upon this point, M. Cl. Bernard remarks: “Iron is the only substance which exists normally in the blood, which has not been found in the excreted liquids. How is it eliminated? This is undecided. A small quantity only is absorbed even in medicamentary usage. It has been found in the hair; but this is a very slow method of elimination.” (*Leçons sur les Propriétés Physiologiques et les Alterations Pathologiques des Liquides de l'Organisme*, Paris, Baillière, 1859, vol. i. pp. 448-9.)



nature, and which necessitate, of course, a suspension of the medicine, or, at least, a marked diminution of the amount administered. Certain persons, also, are far more easily affected by chalybeates than others. In some, this amounts to a species of idiosyncrasy which precludes the use of such remedies, unless combined with other articles whose employment is often not desirable, and sometimes is inadmissible, for peculiar and varying reasons. Thus, we know persons whom iron, given in any considerable quantity, will *purge* persistently; and in some such instances, if opium be combined with it for the purpose of restraining the action of the bowels, *nausea* takes the place of the diarrhoea—a species of intolerance of the medicament seems to exist. This is doubtless not uncommon. There are other manifestations sufficiently indicative of the powerful action of iron upon the system. But such phenomena, and those more especially mentioned above, are distinctly referable to considerable quantities of iron thrown into the organism at once, or gradually. As we have intimated, there appear to be no sufficient *data* whereupon to found any conclusions in reference to a possible pathological result of retention in the blood of the *iron derived from the urine*.<sup>1</sup>

With regard to the curative properties of iron in certain affections, the statements of Dr. Golding Bird have a peculiar fitness to our subject. He says:—

“Among the remedies which appear most successful when food is not converted into healthy chyle, and an unhealthy state of the blood from the presence of imperfectly assimilated matters results, the preparations of iron deserve notice. I have repeatedly seen copious deposits of uric acid, in persons of low power, completely disappear *pari passu* with the cure of the pseudo-chlorotic symptoms present, by the use of this important drug.”

This is literally “killing two birds with one stone,” enriching the blood, and depurating it, also. There can be little to fear from *iron* when judiciously administered; it is to be hoped that any “morbid effects” from large amounts existing in the circulation, in whatever way this may be produced, will by and by be satisfactorily and fully ascertained and explained. It would seem, however, that, had any very marked pathological phenomena been constantly, or even frequently, specially dependent upon accumulation from urinary obstruction or failure of due elimination, the acumen of the numerous competent observers of disease, so continually on the watch for such manifestations, would, ere this, have given us some positive ideas upon the subject.

*Uræmatine*.—There are some interesting observations relative to *uræmatine*, which it seems desirable to present at this time. *Uræmatine* is believed to be derived, in great measure, from the hæmatine set free during

<sup>1</sup> “The analysis of the urine may prove useful for determining the amount of iron which enters the blood and circulation when it is taken as a medicine.” (Thudichum.)

the disintegration of the blood-corpuscles, which is always taking place. *Cholæmatine*, the colouring matter of the bile, is also considered a product of hæmatine. The colour of hæmatine is known to be very persistent. The colour of the fæces and urine is ascribed by Dr. Thudichum to "effete hæmatine." He also alludes to the fact that iron is always conjoined with uræmatine as a component element, and considers this as confirmatory of its origin from the colouring matter of the blood-corpuscles.<sup>1</sup>

Vogel has shown that the amount of uræmatine is increased in acute febrile diseases; in those which partake of an anæmic or chlorotic nature there is less colouring matter discharged. This is ascribed to the diminution of the disintegration process constantly going on, as has been said, with greater or less activity. In typhoidal conditions, and in fevers of a septic type, there being great dissolution of the blood, the colour of the urine is heightened.

When hæmato-globuline appears in the urine, it is indicative of destruction of the blood-corpuscles, and is a sign of serious import. If only transitory, however, and not recurrent, the case becomes more hopeful. "But when it is a symptom of severe scorbutic or septic disorders, it is a sign of great danger to the life of the patient. Suppression of the urine, and discoloration of the skin, when following the discharge of urine rich in hæmatoglobuline, are also very unfavourable, and are forerunners of a fatal termination of the case." (Thudichum, *op. cit.*, p. 237.)

In discussing a question like that proposed for the subject of this essay, there is much to trammel us, on the score of incomplete revelations of the chemical and pathological elements concerned. The great interest and importance of the theme itself, and of the studies and investigations rendered necessary for its thorough and progressive examination, will more and more rapidly bring hidden truths to light. Practical experiments, and the continued observation of those engaged in medical pursuits, were never more needed than in elaborating the processes and extending the records already so well begun—instituting new methods and employing more profound scrutiny. And especially to those who have the great advantage of being connected with large hospitals, are rare opportunities afforded for these pursuits, destined, as they certainly are, to benefit suffering humanity, by enabling the members of our profession with more facility and certainty, in this class of cases, *prius cognoscere, dein sanare*.

<sup>1</sup> For methods of ascertaining the quantity of uræmatine in healthy urine, the amount passed in twenty-four hours, and much valuable information relative to the various shades of colour observed in urine, together with illustrations, see Dr. Thudichum's work. Consult, also, Vogel, "Archiv. des Vereins für gemeinschaftliche Arbeiten," Bd. i. p. 137, 1853.

## APPENDIX.

## NOTE A.

*Urea ; questions relative to its agency in the system.*

In a lately published work,<sup>1</sup> M. Claude Bernard discusses the question whether urea is to be considered a toxæmic agent, either *per se* or by any product derived from it. The respect which the opinions of this distinguished observer must always command, and the very recent date of the conclusions at which he has arrived upon this subject, induce us to present such of them as are most essential to our purpose.

"Is urea a poison?" asks M. Bernard, referring to the views of Frerichs. A poisonous substance, he goes on to say, although it may, like urea, be present in the circulation, is not necessarily toxic in every, even the smallest amount. "A violent poison may, then, exist in the blood, in very noticeable proportion, without occasioning symptoms of poisoning, if elimination be sufficiently rapid; we are not, consequently, authorized to declare that urea is not a poison because it is formed in the blood in considerable quantities." (Vol. ii. p. 33.) Bernard then refers to the experiments of M. Gallois, who found the injection of urea into the blood, innocuous, even in large quantities. We must, then, he continues, admitting the fact of innocuousness, seek another explanation. The theory of Frerichs does not seem sufficient, according to Bernard, to account for the phenomena observed. If carbonate of ammonia be injected in small quantity into the vessels, there is no result; and even when introduced into the veins of animals in larger amounts, although an extreme agitation was produced, yet life was maintained. Carbonate of ammonia, moreover, has nearly always been found both in pathological and in healthy blood. "Consequently, its presence in the blood cannot explain the special accidents of uræmia." Bernard therefore adopts another explanation, and puts forward the following views in preference to the others referred to. 1. The condition of the kidneys in advanced renal disease; there is softening, breaking down of the tissue—"fonte putride." 2. By destroying the nerves going to the kidneys, their disorganization is produced; softening and purulent formations are brought on; pus is thrown into the circulation; and thus renal nutrition is wholly perverted, the kidneys becoming decomposed. In this state of things, Bernard is inclined to ascribe the poisoning of the blood and the resulting phenomena to the agency of the putrid matter thrown into the circulation from the injured kidney. He admits, however, that new experiments are necessary. Thus, we ought to see what effects will be produced by injecting the putrid matter from a kidney

<sup>1</sup> "Cours de Médecine du Collège de France. Leçons sur les Propriétés Physiologiques et les Alterations Pathologiques des Liquides de l'Organisme." Par M. Claude Bernard, Membre de l'Institut de France, Professeur de Médecine au Collège de France, Professeur de Physiologie Générale à la Faculté des Sciences, etc. etc. Paris, J. B. Baillière et Fils, 1859.

which has become disorganized by artificial destruction of its nerves, into the blood of a healthy animal—in fact we must ascertain whether the accidents supervening under such conditions will put on the aspect of the nervous phenomena of uræmia.

“There is no physiological office (*rôle*) known as especially appertaining to urea; it is a purely excrementitious substance, not a secretion. It is regularly eliminated by the kidneys; when this elimination is interfered with, we observe the supervention of grave phenomena, without being able to say whether they are, either primarily or secondarily, the consequence of an accumulation of urea in the blood, or whether they are dependent upon the lesion which has caused the accumulation.” The phenomena referred to, says Bernard, have received the name *uræmia*. “Is it proper to class under the same category the convulsions of lying-in women?” [as we have seen has been done by Braun and others.] This is a question, according to Bernard, which is yet to be examined, and which it would be premature to pretend positively to answer at present. *En resumé*, Bernard thinks the accumulation of urea, or of carbonate of ammonia, in the blood, cannot explain the disorders alluded to; but that it is far more plausible to believe them referable to destruction or injury of the renal nerves.<sup>1</sup> [This, however, would not explain the so-called uræmic convulsions of pregnancy, since a sort of artificial, or curable, Bright’s disease—curable by the act of parturition—may then exist. The question is yet in dispute.]

Dr. E. Brown-Séquard, in the number of the *Journal de la Physiologie de l’Homme et des Animaux*, for January, 1859, makes the following comments upon Dr. Hammond’s experiments and conclusions; and we are happy to avail ourselves of this distinguished physiologist’s opinions upon this subject, especially in view of the very recent date of their announcement. Dr. Séquard, after giving Dr. Hammond’s views and processes, as published in *The North American Medico-Chirurgical Review* for March, 1858, goes on to say: “We shall confine ourselves to the following remarks: 1. The author has not shown so conclusively, as he seems to suppose, the non-conversion of urea into ammonia (he employed hydrochloric acid as a reagent); 2. Injection into the jugular vein, of substances whose action is sought for, is a procedure very liable to make us suppose a non-poisonous substance poisonous, by reason of the disturbance which the injection of any liquid whatever into this vein sometimes produces in the movements of the heart; 3. In dogs from whom the kidneys have been removed, the injection of four ounces of pure water is capable of producing the same morbid effects which the author observed after injecting the different salts and urea, contained in four ounces of water. We conclude, then, that Dr. Hammond’s experiments, exceedingly interesting though they are, are not sufficient to overthrow the ingenious theory of M. Frerichs. Of the two divisions of this theory, that which considers urea not to be a poison, or, at least, not to be capable of producing uræmia, seems scarcely to be shaken by the experiments of Dr. Hammond. As to the other division, according to which uræmia is a poisoning due to the carbonate of ammonia, more powerful arguments than those we have cited above have already been urged against it, and, at the present

<sup>1</sup> For Bernard’s remarks, *in extenso*, see the work cited, vol. ii. pages 34—37 inclusive.

time, it seems very probable that uræmia is an aggregation of symptoms dependent upon various causes, among which, poisoning by carbonate of ammonia has only a variable proportion of influence.

"The experiments of M. Gallois (*Thèse inaugurale*, Paris, 1859) may be considered more positive than those of the American physiologist, in showing that urea is a poison. M. Gallois has seen rabbits die, after violent convulsions, from the administration of twenty grammes of urea, introduced into the stomach. But we have no proof that urea is not transformed into carbonate of ammonia, or into some other toxic element." (*Loc. cit.*)

M. Guérard (*Dict. de Médecine*, in 30 vols., Art. *Sang*), referring to the accumulation of urea in the blood, thus writes: "This accumulation in the blood of a principle whose elements are endowed with such an excessive mobility, and which separate themselves with the greatest facility in order to transform themselves into carbonate of ammonia, eminently deserves to arrest the attention of physiologists, on account of the accidents to which it will unfailingly give rise." He then asks, "if it be not probable that the ammoniacal odour pervading the excretions of those who have long had suppression of urine, is the result of the metamorphosis mentioned? The plausibility of this opinion becomes greater if it be remembered that many observers have assured themselves of the existence of urea in the fluids effused into the various serous cavities, in persons who have died of Bright's disease." M. Guérard refers, in this connection, to Dr. Babington. (*Cyclopædia of Anatomy and Physiology*, Art. *Blood*.)

#### NOTE B.

##### *The Relation of Uric Acid to Gout.*

Dr. Barlow (*A Manual of the Practice of Medicine*, London, 1856), referring to the explanation given by Dr. W. Budd (*Medico-Chirurgical Transactions*), in respect to the elective affinity manifested by certain morbid matters for certain organs and parts of the body, speaks of the support which the humoral pathology of the various gouty affections may reasonably derive from these views; but he is by no means inclined to allow uric acid the important position of chief agent in the production of gout. He says: "It is not, however, intended to imply by what has been said, that lithic or uric acid is the alone or efficient cause of gout; for if this were true, we should always have gout when uric acid is in abundance [not so, we would remark, if it be in process of elimination, and is not *retained and accumulated in the blood*—for such are the elements evidently required for the production of the disease], and never have gout without it; whereas, the presence of the one without the other, especially of uric acid without gout, is a matter of everyday experience." [For the reason above alleged; for if uric acid appear in abundance in the urine, we infer from the fact alone, as a rule, its free elimination; consequently, it does not accumulate in the blood, and gout does not occur.] Dr. Barlow continues: "Upon what the gouty diathesis or susceptibility depends we know nothing [?]; it manifests itself in the system by an affinity for the gouty poison (uric acid it may be) in different parts. If this diathesis be such as to produce an affinity of extraordinary intensity, there may be a local excess of this substance, without any such excess, or even with a deficiency, in the system at large, just as there

may be a local hyperæmia, although the general state of the system may be anæmic. This explanation of the difficulty is merely suggested as possible, not enunciated as certain; it nevertheless derives confirmation from the recent observation of Dr. Garrod that uric acid is present in the serum, effused when a blister has been applied over a joint affected with gouty inflammation." (*Op. cit.*, English edition, 1856, p. 143.) Aside from the force of the evidence adduced by Dr. Garrod in the test referred to by Dr. Barlow, we cannot think the position of the latter author is strengthened by the analogy which he attempts to establish—or the similarity which he would imply, in vital action—between local hyperæmia in general anæmic states and the deposition of urate of soda by elective affinity. In fine, in the one case, the blood, although deteriorated, does not, in the circumstances proposed, contain a poison; whereas, in the latter case, it does, or the local manifestations thereof would not occur. Mere local hyperæmia, occurring as above mentioned, cannot be properly compared with the local exhibition, by vicarious action, of the product of an abnormal amount of uric acid in the blood.

wherever necessary. It has now been issued regularly for nearly forty years, and it has been under the control of the present editor for more than a quarter of a century. Throughout this long period, it has maintained its position in the highest rank of medical periodicals both at home and abroad, and has received the cordial support of the entire profession in this country. Its list of Collaborators will be found to contain a large number of the most distinguished names of the profession in every section of the United States, rendering the department devoted to

### ORIGINAL COMMUNICATIONS

full of varied and important matter, of great interest to all practitioners.

As the aim of the Journal, however, is to combine the advantages presented by all the different varieties of periodicals, in its

### REVIEW DEPARTMENT

will be found extended and impartial reviews of all important new works, presenting subjects of novelty and interest, together with very numerous

### BIBLIOGRAPHICAL NOTICES,

including nearly all the medical publications of the day, both in this country and Great Britain, with a choice selection of the more important continental works. This is followed by the

### QUARTERLY SUMMARY,

being a very full and complete abstract, methodically arranged, of the

### IMPROVEMENTS AND DISCOVERIES IN THE MEDICAL SCIENCES.

This department of the Journal, so important to the practising physician, is the object of especial care on the part of the editor. It is classified and arranged under different heads, thus facilitating the researches of the reader in pursuit of particular subjects, and will be found to present a very full and accurate digest of all observations, discoveries, and inventions recorded in every branch of medical science. The very extensive arrangements of the publishers are such as to afford to the editor complete materials for this purpose, as he not only regularly receives

### ALL THE AMERICAN MEDICAL AND SCIENTIFIC PERIODICALS,

but also twenty or thirty of the more important Journals issued in Great Britain and on the Continent, thus enabling him to present in a convenient compass a thorough and complete abstract of everything interesting or important to the physician occurring in any part of the civilized world.

To their old subscribers, many of whom have been on their list for twenty or thirty years, the publishers feel that no promises for the future are necessary; but those who may desire for the first time to subscribe, can rest assured that no exertion will be spared to maintain the Journal in the high position which it has occupied for so long a period.

By reference to the terms it will be seen that, in addition to this large amount of valuable and practical information on every branch of medical science, the subscriber, by paying in advance, becomes entitled, without further charge, to

### THE MEDICAL NEWS AND LIBRARY,

a monthly periodical of thirty-two large octavo pages. Its "NEWS DEPARTMENT" presents the current information of the day, while the "LIBRARY DEPARTMENT" is devoted to presenting standard works on various branches of medicine. Within a few years, subscribers have thus received, without expense, many works of the highest character and practical value, such as "Watson's Practice," "Todd and Bowman's Physiology," "Malgaigne's Surgery," "West on Children," "West on Females, Part I.," "Habershon on the Alimentary Canal," &c.

While in the number for January, 1860, is commenced a new and highly important work,

### CLINICAL LECTURES ON THE DISEASES OF WOMEN.

By PROFESSOR J. Y. SIMPSON, of Edinburgh.

### WITH NUMEROUS HANDSOME ILLUSTRATIONS.

These Lectures, published in England under the supervision of the Author, carry with them all the weight of his wide experience and distinguished reputation. Their eminently practical nature, and the importance of the subject treated, cannot fail to render them in the highest degree satisfactory to subscribers, who can thus secure them without cost. These Lectures are continued in the "News" for 1861.

It will thus be seen that for the small sum of FIVE DOLLARS, paid in advance, the subscriber will obtain a Quarterly and a Monthly periodical,

### EMBRACING NEARLY SIXTEEN HUNDRED LARGE OCTAVO PAGES.

mailed to any post-office in the United States, free of postage.

Those subscribers who do not pay in advance will bear in mind that their subscription of Five Dollars will entitle them to the Journal only, without the News, and that they will be at the expense of their own postage on the receipt of each number. The advantage of a remittance when ordering the Journal will thus be apparent.

As the Medical News and Library is in no case sent without advance payment, its subscribers will always receive it free of postage.

Remittances of subscriptions can be mailed at our risk, when a certificate is taken from the Postmaster that the money is duly inclosed and forwarded.

Address **BLANCHARD & LEA, PHILADELPHIA.**

ASHTON (T. J.),

Surgeon to the Blenheim Dispensary, &amp;c.

**ON THE DISEASES, INJURIES, AND MALFORMATIONS OF THE RECTUM AND ANUS;** with remarks on Habitual Constipation. From the third and enlarged London edition. With handsome illustrations. In one very beautifully printed octavo volume, of about 300 pages. (*Just Issued.*) \$2 00.

INTRODUCTION. CHAPTER I. Irritation and Itching of the Anus. II. Inflammation and Excoriation of the Anus. III. Excrescences of the Anal Region. IV. Contraction of the Anus. V. Fissure of the Anus and lower part of the Rectum. VI. Neuralgia of the Anus and extremity of the Rectum. VII. Inflammation of the Rectum. VIII. Ulceration of the Rectum. IX. Hemorrhoidal Affections. X. Enlargement of Hemorrhoidal Veins. XI. Prolapsus of the Rectum. XII. Abscess near the Rectum. XIII. Fistula in Ano. XIV. Polypi of the Rectum. XV. Stricture of the Rectum. XVI. Malignant Diseases of the Rectum. XVII. Injuries of the Rectum. XVIII. Foreign Bodies in the Rectum. XIX. Malformations of the Rectum. XX. Habitual Constipation.

The most complete one we possess on the subject.

*Medico-Chirurgical Review.*

We are satisfied, after a careful examination of the volume, and a comparison of its contents with those of its leading predecessors and contemporaries, that the best way for the reader to avail himself of

the excellent advice given in the concluding paragraph above, would be to provide himself with a copy of the book from which it has been taken, and diligently to con its instructive pages. They may secure to him many a triumph and fervent blessing.—*Am. Journal Med. Sciences*, April, 1853.

ALLEN (J. M.), M. D.,

Professor of Anatomy in the Pennsylvania Medical College, &amp;c.

**THE PRACTICAL ANATOMIST;** or, The Student's Guide in the Dissecting-ROOM. With 266 illustrations. In one handsome royal 12mo. volume, of over 600 pages, leather. \$2 25.

We believe it to be one of the most useful works upon the subject ever written. It is handsomely illustrated, well printed, and will be found of convenient size for use in the dissecting-room.—*Med. Examiner.*

However valuable may be the "Dissector's Guides" which we, of late, have had occasion to

notice, we feel confident that the work of Dr. Allen is superior to any of them. We believe with the author, that none is so fully illustrated as this, and the arrangement of the work is such as to facilitate the labors of the student. We most cordially recommend it to their attention.—*Western Lancet.*

ANATOMICAL ATLAS.

By Professors H. H. SMITH and W. E. HORNER, of the University of Pennsylvania. 1 vol. 8vo., extra cloth, with nearly 650 illustrations. See SMITH, p. 331.

ABEL (F. A.), F. C. S. AND C. L. BLOXAM.

**HANDBOOK OF CHEMISTRY,** Theoretical, Practical, and Technical; with a Recommendatory Preface by Dr. HOFMANN. In one large octavo volume, extra cloth, of 662 pages, with illustrations. \$3 25.

ASHWELL (SAMUEL), M. D.,

Obstetric Physician and Lecturer to Guy's Hospital, London.

**A PRACTICAL TREATISE ON THE DISEASES PECULIAR TO WOMEN.**

Illustrated by Cases derived from Hospital and Private Practice. Third American, from the Third and revised London edition. In one octavo volume, extra cloth, of 528 pages. \$3 00.

The most useful practical work on the subject in the English language.—*Boston Med. and Surg. Journal.*

The most able, and certainly the most standard and practical, work on female diseases that we have yet seen.—*Medico-Chirurgical Review.*

ARNOTT (NEILL), M. D.

**ELEMENTS OF PHYSICS;** or Natural Philosophy, General and Medical.

Written for universal use, in plain or non-technical language. A new edition, by ISAAC HAYS, M. D. Complete in one octavo volume, leather, of 484 pages, with about two hundred illustrations. \$2 50.

BIRD (GOLDING), A. M., M. D., &amp;c.

**URINARY DEPOSITS: THEIR DIAGNOSIS, PATHOLOGY, AND THERAPEUTICAL INDICATIONS.** Edited by EDMUND LLOYD BIRKETT, M. D. A new American, from the fifth and enlarged London edition. With eighty illustrations on wood. In one handsome octavo volume, of about 400 pages, extra cloth. \$2 00. (*Just Issued.*)

The death of Dr. Bird has rendered it necessary to entrust the revision of the present edition to other hands, and in his performance of the duty thus devolving on him, Dr. Birkett has sedulously endeavored to carry out the author's plan by introducing such new matter and modifications of the text as the progress of science has called for. Notwithstanding the utmost care to keep the work within a reasonable compass, these additions have resulted in a considerable enlargement. It is, therefore, hoped that it will be found fully up to the present condition of the subject, and that the reputation of the volume as a clear, complete, and compendious manual, will be fully maintained.

BENNETT (J. HUGHES), M. D., F. R. S. E.,

Professor of Clinical Medicine in the University of Edinburgh, &amp;c.

**THE PATHOLOGY AND TREATMENT OF PULMONARY TUBERCULOSIS,** and on the Local Medication of Pharyngeal and Laryngeal Diseases frequently mistaken for or associated with, Phthisis. One vol. 8vo., extra cloth, with wood-cuts. pp. 130. \$1 25.



BARWELL (RICHARD,) F. R. C. S.,  
Assistant Surgeon Charing Cross Hospital, &c.

**A TREATISE ON DISEASES OF THE JOINTS.** Illustrated with engravings on wood. In one very handsome octavo volume, of about 500 pages. (*Nearly Ready.*)

"A treatise on Diseases of the Joints equal to, or rather beyond the current knowledge of the day, has long been required—my professional brethren must judge whether the ensuing pages may supply the deficiency. No author is fit to estimate his own work at the moment of its completion, but it may be permitted me to say that the study of joint diseases has very much occupied my attention, even from my studentship, and that for the last six or eight years my devotion to that subject has been almost unremitting. . . . The real weight of my work has been at the bedside, and the greatest labor devoted to interpreting symptoms and remedying their cause."—AUTHOR'S PREFACE.

At the outset we may state that the work is worthy of much praise, and bears evidence of much thoughtful and careful inquiry, and here and there of no slight originality. We have already carried this notice further than we intended to do, but not to the extent the work deserves. We can only add, that the perusal of it has afforded us great pleasure. The author has evidently worked very hard at his subject, and his investigations into the Physiology and Pathology of Joints have been carried on in a manner which entitles him to be listened to with attention and respect. We must not omit to mention the very admirable plates with which the volume is enriched. We seldom meet with such striking and faithful delineations of disease.—*London Med. Times and Gazette*, Feb. 9, 1861.

We cannot take leave, however, of Mr. Barwell, without congratulating him on the interesting amount of information which he has compressed into his book. The work appears to us calculated

to be of much use to the practising surgeon who may be in want of a treatise on diseases of the joints, and at the same time one which contains the latest information on articular affections and the operations for their cure.—*Dublin Med. Press*, Feb. 27, 1861.

This volume will be welcomed, both by the pathologist and the surgeon, as being the record of much honest research and careful investigation into the nature and treatment of a most important class of disorders. We cannot conclude this notice of a valuable and useful book without calling attention to the amount of *bonâ fide* work it contains. In the present day of universal book-making, it is no slight matter for a volume to show laborious investigation, and at the same time original thought, on the part of its author, whom we may congratulate on the successful completion of his arduous task.—*London Lancet*, March 9, 1861.

CARPENTER (WILLIAM B.), M. D., F. R. S., &c.,  
Examiner in Physiology and Comparative Anatomy in the University of London.

**PRINCIPLES OF HUMAN PHYSIOLOGY;** with their chief applications to

Psychology, Pathology, Therapeutics, Hygiene, and Forensic Medicine. A new American, from the last and revised London edition. With nearly three hundred illustrations. Edited, with additions, by FRANCIS GURNEY SMITH, M. D., Professor of the Institutes of Medicine in the Pennsylvania Medical College, &c. In one very large and beautiful octavo volume, of about nine hundred large pages, handsomely printed and strongly bound in leather, with raised bands. \$4 25.

In the preparation of this new edition, the author has spared no labor to render it, as heretofore, a complete and lucid exposition of the most advanced condition of its important subject. The amount of the additions required to effect this object thoroughly, joined to the former large size of the volume, presenting objections arising from the unwieldy bulk of the work, he has omitted all those portions not bearing directly upon HUMAN PHYSIOLOGY, designing to incorporate them in his forthcoming Treatise on GENERAL PHYSIOLOGY. As a full and accurate text-book on the Physiology of Man, the work in its present condition therefore presents even greater claims upon the student and physician than those which have heretofore won for it the very wide and distinguished favor which it has so long enjoyed. The additions of Prof. Smith will be found to supply whatever may have been wanting to the American student, while the introduction of many new illustrations, and the most careful mechanical execution, render the volume one of the most attractive as yet issued.

For upwards of thirteen years Dr. Carpenter's work has been considered by the profession generally, both in this country and England, as the most valuable compendium on the subject of physiology in our language. This distinction it owes to the high attainments and unwearied industry of its accomplished author. The present edition (which, like the last American one, was prepared by the author himself), is the result of such extensive revision, that it may almost be considered a new work. We need hardly say, in concluding this brief notice, that while the work is indispensable to every student of medicine in this country, it will amply repay the practitioner for its perusal by the interest and value of its contents.—*Boston Med. and Surg. Journal*.

This is a standard work—the text-book used by all medical students who read the English language. It has passed through several editions in order to keep pace with the rapidly growing science of Physiology. Nothing need be said in its praise, for its merits are universally known; we have nothing to say of its defects, for they only appear where the science of which it treats is incomplete.—*Western Lancet*.

The most complete exposition of physiology which any language can at present give.—*Brit. and For. Med.-Chirurg. Review*.

The greatest, the most reliable, and the best book on the subject which we know of in the English language.—*Stethoscope*.

To eulogize this great work would be superfluous. We should observe, however, that in this edition the author has remodelled a large portion of the former, and the editor has added much matter of interest, especially in the form of illustrations. We may confidently recommend it as the most complete work on Human Physiology in our language.—*Southern Med. and Surg. Journal*.

The most complete work on the science in our language.—*Am. Med. Journal*.

The most complete work now extant in our language.—*N. O. Med. Register*.

The best text-book in the language on this extensive subject.—*London Med. Times*.

A complete cyclopædia of this branch of science.—*N. Y. Med. Times*.

The profession of this country, and perhaps also of Europe, have anxiously and for some time awaited the announcement of this new edition of Carpenter's Human Physiology. His former editions have for many years been almost the only text-book on Physiology in all our medical schools, and its circulation among the profession has been unsurpassed by any work in any department of medical science.

It is quite unnecessary for us to speak of this work as its merits would justify. The mere announcement of its appearance will afford the highest pleasure to every student of Physiology, while its perusal will be of infinite service in advancing physiological science.—*Ohio Med. and Surg. Journ.*

CARPENTER (WILLIAM B.), M. D., F. R. S.,

Examiner in Physiology and Comparative Anatomy in the University of London.

**THE MICROSCOPE AND ITS REVELATIONS.** With an Appendix containing the Applications of the Microscope to Clinical Medicine, &c. By F. G. SMITH, M. D. Illustrated by four hundred and thirty-four beautiful engravings on wood. In one large and very handsome octavo volume, of 724 pages, extra cloth, \$4 00; leather, \$4 50.

Dr. Carpenter's position as a microscopist and physiologist, and his great experience as a teacher, eminently qualify him to produce what has long been wanted—a good text-book on the practical use of the microscope. In the present volume his object has been, as stated in his Preface, "to combine, within a moderate compass, that information with regard to the use of his 'tools,' which is most essential to the working microscopist, with such an account of the objects best fitted for his study, as might qualify him to comprehend what he observes, and might thus prepare him to benefit science, whilst expanding and refreshing his own mind." That he has succeeded in accomplishing this, no one acquainted with his previous labors can doubt.

The great importance of the microscope as a means of diagnosis, and the number of microscopists who are also physicians, have induced the American publishers, with the author's approval, to add an Appendix, carefully prepared by Professor Smith, on the applications of the instrument to clinical medicine, together with an account of American Microscopes, their modifications and accessories. This portion of the work is illustrated with nearly one hundred wood-cuts, and, it is hoped, will adapt the volume more particularly to the use of the American student.

Those who are acquainted with Dr. Carpenter's previous writings on Animal and Vegetable Physiology, will fully understand how vast a store of knowledge he is able to bring to bear upon so comprehensive a subject as the revelations of the microscope; and even those who have no previous acquaintance with the construction or uses of this instrument, will find abundance of information conveyed in clear and simple language.—*Med. Times and Gazette*.

Although originally not intended as a strictly

medical work, the additions by Prof. Smith give it a positive claim upon the profession, for which we doubt not he will receive their sincere thanks. Indeed, we know not where the student of medicine will find such a complete and satisfactory collection of microscopic facts bearing upon physiology and practical medicine as is contained in Prof. Smith's appendix; and this of itself, it seems to us, is fully worth the cost of the volume.—*Louisville Medical Review*.

BY THE SAME AUTHOR.

**ELEMENTS (OR MANUAL) OF PHYSIOLOGY, INCLUDING PHYSIOLOGICAL ANATOMY.** Second American, from a new and revised London edition. With one hundred and ninety illustrations. In one very handsome octavo volume, leather. pp. 566. \$3 00.

In publishing the first edition of this work, its title was altered from that of the London volume, by the substitution of the word "Elements" for that of "Manual," and with the author's sanction the title of "Elements" is still retained as being more expressive of the scope of the treatise.

To say that it is the best manual of Physiology now before the public, would not do sufficient justice to the author.—*Buffalo Medical Journal*.

In his former works it would seem that he had exhausted the subject of Physiology. In the present, he gives the essence, as it were, of the whole.—*N. Y. Journal of Medicine*.

Those who have occasion for an elementary treatise on Physiology, cannot do better than to possess themselves of the manual of Dr. Carpenter.—*Medical Examiner*.

The best and most complete exposé of modern Physiology, in one volume, extant in the English language.—*St. Louis Medical Journal*.

BY THE SAME AUTHOR.

**PRINCIPLES OF COMPARATIVE PHYSIOLOGY.** New American, from the Fourth and Revised London edition. In one large and handsome octavo volume, with over three hundred beautiful illustrations. pp. 752. Extra cloth, \$4 80; leather, raised bands, \$5 25.

This book should not only be read but thoroughly studied by every member of the profession. None are too wise or old, to be benefited thereby. But especially to the younger class would we cordially commend it as best fitted of any work in the English language to qualify them for the reception and comprehension of those truths which are daily being developed in physiology.—*Medical Counsellor*.

Without pretending to it, it is an encyclopedia of the subject, accurate and complete in all respects—a truthful reflection of the advanced state at which the science has now arrived.—*Dublin Quarterly Journal of Medical Science*.

A truly magnificent work—in itself a perfect physiological study.—*Ranking's Abstract*.

This work stands without its fellow. It is one few men in Europe could have undertaken; it is one

no man, we believe, could have brought to so successful an issue as Dr. Carpenter. It required for its production a physiologist at once deeply read in the labors of others, capable of taking a general, critical, and unprejudiced view of those labors, and of combining the varied, heterogeneous materials at his disposal, so as to form an harmonious whole. We feel that this abstract can give the reader a very imperfect idea of the fulness of this work, and no idea of its unity, of the admirable manner in which material has been brought, from the most various sources, to conduce to its completeness, of the lucidity of the reasoning it contains, or of the clearness of language in which the whole is clothed. Not the profession only, but the scientific world at large, must feel deeply indebted to Dr. Carpenter for this great work. It must, indeed, add largely even to his high reputation.—*Medical Times*.

BY THE SAME AUTHOR. (*Preparing.*)

**PRINCIPLES OF GENERAL PHYSIOLOGY, INCLUDING ORGANIC CHEMISTRY AND HISTOLOGY.** With a General Sketch of the Vegetable and Animal Kingdom. In one large and very handsome octavo volume, with several hundred illustrations.

BY THE SAME AUTHOR.

**A PRIZE ESSAY ON THE USE OF ALCOHOLIC LIQUORS IN HEALTH AND DISEASE.** New edition, with a Preface by D. F. CONDIE, M. D., and explanations of scientific words. In one neat 12mo. volume, extra cloth. pp. 178. 50 cents.



# BLANCHARD & LEA'S MEDICAL AND SURGICAL PUBLICATIONS.

## TO THE MEDICAL PROFESSION.


The prices on the present catalogue are those at which our books can generally be furnished by booksellers throughout the United States, who can readily procure any which they may not have on hand. To physicians who have not convenient access to bookstores, we will forward them by mail, at these prices, *free of postage* for any distance, accessible by mail, in the United States under 1,500 miles. As we open accounts only with booksellers, the amount must in every case, without exception, accompany the order, and we assume no risks of the mail, either on the money or on the books; and as we deal only in our own publications, we can supply no others. Gentlemen desirous of purchasing will, therefore, find it more advantageous to deal with the nearest booksellers whenever practicable.

BLANCHARD & LEA.

PHILADELPHIA, July, 1861.

\* \* We have recently issued an ILLUSTRATED CATALOGUE of Medical and Scientific Publications, forming an octavo pamphlet of 80 large pages, containing specimens of illustrations, notices of the medical press, &c. &c. It has been prepared without regard to expense, and will be found one of the handsomest specimens of typographical execution as yet presented in this country. Copies will be sent to any address, by mail, free of postage, on receipt of nine cents in stamps.

Catalogues of our numerous publications in miscellaneous and educational literature forwarded on application.

 The attention of physicians is especially solicited to the following important new works and new editions, just issued or nearly ready:—

Ashton on the Rectum, . . . . .	See page 3
Bumstead on Venereal, . . . . .	" 5
Barwell on the Joints, . . . . .	" 6
Condie on Diseases of Children, . . . . .	" 8
Churchill's Midwifery, . . . . .	" 9
Dickson's Elements of Medicine, . . . . .	" 10
Druitt's Surgery, . . . . .	" 10
Dalton's Human Physiology, 2d edition, . . . . .	" 11
Dunglison's Medical Dictionary, . . . . .	" 12
Erichsen's System of Surgery, . . . . .	" 14
Flint on the Heart, . . . . .	" 14
Fownes' Manual of Chemistry, . . . . .	" 15
Gross's System of Surgery, . . . . .	" 16
Gray's Anatomy, Descriptive and Surgical, . . . . .	" 17
Hamilton on Fractures and Dislocations, . . . . .	" 18
Hodge on Diseases of Women, . . . . .	" 19
Lyons on Fever, . . . . .	" 21
Meigs on Diseases of Women, . . . . .	" 21
Parrish's Practical Pharmacy, . . . . .	" 25
Slade on Diphtheria, . . . . .	" 26
Stille's Therapeutics and Materia Medica, . . . . .	" 27
Simpson on Diseases of Women, . . . . .	" 27
Toyabee on the Ear, . . . . .	" 29
Watson's Practice of Physic, . . . . .	" 30
Walshe on the Lungs, . . . . .	" 30
Winslow on Brain and Mind, . . . . .	" 32
West on Diseases of Children, . . . . .	" 32
West on Diseases of Women, . . . . .	" 32

## TWO MEDICAL PERIODICALS, FREE OF POSTAGE,

Containing over Fifteen Hundred large octavo pages,  
**FOR FIVE DOLLARS PER ANNUM.**

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, subject  
to postage, when not paid for in advance, . . . . . \$5 00  
THE MEDICAL NEWS AND LIBRARY, invariably in advance, . . . . . 1 00  
or, BOTH PERIODICALS mailed, **FREE OF POSTAGE**, to any post-office in the  
United States, for Five Dollars remitted in advance.

## THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES,

EDITED BY ISAAC HAYS, M. D.,

is published Quarterly, on the first of January, April, July, and October. Each number contains at least two hundred and eighty large octavo pages, handsomely and appropriately illustrated.

**CHURCHILL (FLEETWOOD), M. D., M. R. I. A., &c.**  
**ON THE DISEASES OF WOMEN;** including those of Pregnancy and Child-bed. A new American edition, revised by the Author. With Notes and Additions, by D. FRANCIS CONDIE, M. D., author of "A Practical Treatise on the Diseases of Children." With numerous illustrations. In one large and handsome octavo volume, leather, of 768 pages. \$3 00.

This edition of Dr. Churchill's very popular treatise may almost be termed a new work, so thoroughly has he revised it in every portion. It will be found greatly enlarged, and completely brought up to the most recent condition of the subject, while the very handsome series of illustrations introduced, representing such pathological conditions as can be accurately portrayed, present a novel feature, and afford valuable assistance to the young practitioner. Such additions as appeared desirable for the American student have been made by the editor, Dr. Condie, while a marked improvement in the mechanical execution keeps pace with the advance in all other respects which the volume has undergone, while the price has been kept at the former very moderate rate.

It comprises, unquestionably, one of the most exact and comprehensive expositions of the present state of medical knowledge in respect to the diseases of women that has yet been published.—*Am. Journ. Med. Sciences.*

This work is the most reliable which we possess on this subject; and is deservedly popular with the profession.—*Charleston Med. Journal*, July, 1857.

We know of no author who deserves that approbation, on "the diseases of females," to the same

extent that Dr. Churchill does. His, indeed, is the only thorough treatise we know of on the subject; and it may be commended to practitioners and students as a masterpiece in its particular department.—*The Western Journal of Medicine and Surgery.*

As a comprehensive manual for students, or a work of reference for practitioners, it surpasses any other that has ever issued on the same subject from the British press.—*Dublin Quart. Journal.*

**DICKSON (S. H.), M. D.,**  
 Professor of Practice of Medicine in the Jefferson Medical College, Philadelphia.  
**ELEMENTS OF MEDICINE;** a Compendious View of Pathology and Therapeutics, or the History and Treatment of Diseases. Second edition, revised. In one large and handsome octavo volume, of 750 pages, leather. \$3 75. (Just Issued.)

The steady demand which has so soon exhausted the first edition of this work, sufficiently shows that the author was not mistaken in supposing that a volume of this character was needed—an elementary manual of practice, which should present the leading principles of medicine with the practical results, in a condensed and perspicuous manner. Disencumbered of unnecessary detail and fruitless speculations, it embodies what is most requisite for the student to learn, and at the same time what the active practitioner wants when obliged, in the daily calls of his profession, to refresh his memory on special points. The clear and attractive style of the author renders the whole easy of comprehension, while his long experience gives to his teachings an authority everywhere acknowledged. Few physicians, indeed, have had wider opportunities for observation and experience, and few, perhaps, have used them to better purpose. As the result of a long life devoted to study and practice, the present edition, revised and brought up to the date of publication, will doubtless maintain the reputation already acquired as a condensed and convenient American text-book on the Practice of Medicine.

**DRUITT (ROBERT), M. R. C. S., &c.**  
**THE PRINCIPLES AND PRACTICE OF MODERN SURGERY.** A new and revised American from the eighth enlarged and improved London edition. Illustrated with four hundred and thirty-two wood-engravings. In one very handsomely printed octavo volume, leather, of nearly 700 large pages. \$3 50. (Now Ready, October, 1860.)

A work which like DRUITT'S SURGERY has for so many years maintained the position of a leading favorite with all classes of the profession, needs no special recommendation to attract attention to a revised edition. It is only necessary to state that the author has spared no pains to keep the work up to its well earned reputation of presenting in a small and convenient compass the latest condition of every department of surgery, considered both as a science and as an art; and that the services of a competent American editor have been employed to introduce whatever novelties may have escaped the author's attention, or may prove of service to the American practitioner. As several editions have appeared in London since the issue of the last American reprint, the volume has had the benefit of repeated revisions by the author, resulting in a very thorough alteration and improvement. The extent of these additions may be estimated from the fact that it now contains about one-third more matter than the previous American edition, and that notwithstanding the adoption of a smaller type, the pages have been increased by about one hundred, while nearly two hundred and fifty wood-cuts have been added to the former list of illustrations.

A marked improvement will also be perceived in the mechanical and artistical execution of the work, which, printed in the best style, on new type, and fine paper, leaves little to be desired as regards external finish; while at the very low price affixed it will be found one of the cheapest volumes accessible to the profession.

This popular volume, now a most comprehensive work on surgery, has undergone many corrections, improvements, and additions, and the principles and the practice of the art have been brought down to the latest record and observation. Of the operations in surgery it is impossible to speak too highly. The descriptions are so clear and concise, and the illustrations so accurate and numerous, that the student can have no difficulty, with instrument in hand, and book by his side, over the dead body, in obtaining a proper knowledge and sufficient tact in this much neglected department of medical education.—*British and Foreign Medico-Chirurg. Review*, Jan. 1860.

In the present edition the author has entirely rewritten many of the chapters, and has incorporated the various improvements and additions in modern surgery. On carefully going over it, we find that

nothing of real practical importance has been omitted; it presents a faithful epitome of everything relating to surgery up to the present hour. It is deservedly a popular manual, both with the student and practitioner.—*London Lancet*, Nov. 19, 1859.

In closing this brief notice, we recommend as cordially as ever this most useful and comprehensive hand-book. It must prove a vast assistance, not only to the student of surgery, but also to the busy practitioner who may not have the leisure to devote himself to the study of more lengthy volumes.—*London Med. Times and Gazette*, Oct. 23, 1859.

In a word, this eighth edition of Dr. Drutt's Manual of Surgery is all that the surgical student or practitioner could desire.—*Dublin Quarterly Journal of Med. Sciences*, Nov. 1859.

DALTON, JR. (J. C.), M. D.

Professor of Physiology in the College of Physicians, New York.

**A TREATISE ON HUMAN PHYSIOLOGY**, designed for the use of Students and Practitioners of Medicine. Second edition, revised and enlarged, with two hundred and seventy-one illustrations on wood. In one very beautiful octavo volume, of 700 pages, extra cloth, \$4 00; leather, raised bands, \$4 50. (*Now Ready*, March, 1861.)

The general favor which has so soon exhausted an edition of this work has afforded the author an opportunity in its revision of supplying the deficiencies which existed in the former volume. This has caused the insertion of two new chapters—one on the Special Senses, the other on Imbibition, Exhalation, and the Functions of the Lymphatic System—besides numerous additions of smaller amount scattered through the work, and a general revision designed to bring it thoroughly up to the present condition of the science with regard to all points which may be considered as definitely settled. A number of new illustrations has been introduced, and the work, it is hoped, in its improved form, may continue to command the confidence of those for whose use it is intended.

It will be seen, therefore, that Dr. Dalton's best efforts have been directed towards perfecting his work. The additions are marked by the same features which characterize the remainder of the volume, and render it by far the most desirable text-book on physiology to place in the hands of the student which, so far as we are aware, exists in the English language, or perhaps in any other. We therefore have no hesitation in recommending Dr. Dalton's book for the classes for which it is intended, satisfied as we are that it is better adapted to their use than any other work of the kind to which they have access.—*American Journal of the Medical Sciences*, April, 1861.

It is, therefore, no disparagement to the many books upon physiology, most excellent in their day, to say that Dalton's is the only one that gives us the science as it was known to the best philosophers throughout the world, at the beginning of the current year. It states in comprehensive but concise diction, the facts established by experiment, or other method of demonstration, and details, in an understandable manner, how it is done, but abstains from the discussion of unsettled or theoretical points. Herein it is unique; and these characteristics render it a text-book without a rival, for those who desire to study physiological science as it is known to its most successful cultivators. And it is physiology thus presented that lies at the foundation of correct pathological knowledge; and this in turn is the basis of rational therapeutics; so that pathology, in fact, becomes of prime importance in the proper discharge of our every-day practical duties.—*Cincinnati Lancet*, May, 1861.

Dr. Dalton needs no word of praise from us. He is universally recognized as among the first, if not the very first, of American physiologists now living. The first edition of his admirable work appeared but two years since, and the advance of science, his

own original views and experiments, together with a desire to supply what he considered some deficiencies in the first edition, have already made the present one a necessity, and it will no doubt be even more eagerly sought for than the first. That it is not merely a reprint, will be seen from the author's statement of the following principal additions and alterations which he has made. The present, like the first edition, is printed in the highest style of the printer's art, and the illustrations are truly admirable for their clearness in expressing exactly what their author intended.—*Boston Medical and Surgical Journal*; March 28, 1861.

It is unnecessary to give a detail of the additions; suffice it to say, that they are numerous and important, and such as will render the work still more valuable and acceptable to the profession as a learned and original treatise on this all-important branch of medicine. All that was said in commendation of the getting up of the first edition, and the superior style of the illustrations, apply with equal force to this. No better work on physiology can be placed in the hand of the student.—*St. Louis Medical and Surgical Journal*, May, 1861.

These additions, while testifying to the learning and industry of the author, render the book exceedingly useful, as the most complete exposé of a science, of which Dr. Dalton is doubtless the ablest representative on this side of the Atlantic.—*New Orleans Med. Times*, May, 1861.

A second edition of this deservedly popular work having been called for in the short space of two years, the author has supplied deficiencies, which existed in the former volume, and has thus more completely fulfilled his design of presenting to the profession a reliable and precise text-book, and one which we consider the best outline on the subject of which it treats, in any language.—*N. American Medico-Chirurg. Review*, May, 1861.

## DUNGLISON, FORBES, TWEEDIE, AND CONOLLY.

**THE CYCLOPÆDIA OF PRACTICAL MEDICINE**: comprising Treatises on the Nature and Treatment of Diseases, Materia Medica, and Therapeutics, Diseases of Women and Children, Medical Jurisprudence, &c. &c. In four large super-royal octavo volumes, of 3254 double-columned pages, strongly and handsomely bound, with raised bands. \$12 00.

\* \* \* This work contains no less than four hundred and eighteen distinct treatises, contributed by sixty-eight distinguished physicians, rendering it a complete library of reference for the country practitioner.

The most complete work on Practical Medicine extant; or, at least, in our language.—*Buffalo Medical and Surgical Journal*.

For reference, it is above all price to every practitioner.—*Western Lancet*.

One of the most valuable medical publications of the day—as a work of reference it is invaluable.—*Western Journal of Medicine and Surgery*.

It has been to us, both as learner and teacher, a work for ready and frequent reference, one in which modern English medicine is exhibited in the most advantageous light.—*Medical Examiner*.

The editors are practitioners of established reputation, and the list of contributors embraces many of the most eminent professors and teachers of London, Edinburgh, Dublin, and Glasgow. It is, indeed, the great merit of this work that the principal articles have been furnished by practitioners who have not only devoted especial attention to the diseases about which they have written, but have also enjoyed opportunities for an extensive practical acquaintance with them and whose reputation carries the assurance of their competency justly to appreciate the opinions of others, while it stamps their own doctrines with high and just authority.—*American Medical Journal*.

**DEWEES'S COMPREHENSIVE SYSTEM OF MIDWIFERY**. Illustrated by occasional cases and many engravings. Twelfth edition, with the author's last improvements and corrections. In one volume, extra cloth, of 600 pages. \$3 20.

**TISE ON THE PHYSICAL**

**AND MEDICAL TREATMENT OF CHILDREN**. The last edition. In one volume, octavo, extra cloth, 548 pages. \$2 80.

**DEWEES'S TREATISE ON THE DISEASES OF FEMALES**. Tenth edition. In one volume, octavo extra cloth, 532 pages, with plates. \$3 50.

ERICHSEN (JOHN),

Professor of Surgery in University College, London, &amp;c.

**THE SCIENCE AND ART OF SURGERY; BEING A TREATISE ON SURGICAL INJURIES, DISEASES, AND OPERATIONS.** New and improved American, from the second enlarged and carefully revised London edition. Illustrated with over four hundred engravings on wood. In one large and handsome octavo volume, of one thousand closely printed pages, leather, raised bands. \$4 50. (*Just Issued.*)

The very distinguished favor with which this work has been received on both sides of the Atlantic has stimulated the author to render it even more worthy of the position which it has so rapidly attained as a standard authority. Every portion has been carefully revised, numerous additions have been made, and the most watchful care has been exercised to render it a complete exponent of the most advanced condition of surgical science. In this manner the work has been enlarged by about a hundred pages, while the series of engravings has been increased by more than a hundred, rendering it one of the most thoroughly illustrated volumes before the profession. The additions of the author having rendered unnecessary most of the notes of the former American editor, but little has been added in this country; some few notes and occasional illustrations have, however, been introduced to elucidate American modes of practice.

It is, in our humble judgment, decidedly the best book of the kind in the English language. Strange that just such books are not oftener produced by public teachers of surgery in this country and Great Britain. Indeed, it is a matter of great astonishment, but no less true than astonishing, that of the many works on surgery republished in this country within the last fifteen or twenty years as text-books for medical students, this is the only one that even approximates to the fulfilment of the peculiar wants of young men just entering upon the study of this branch of the profession.—*Western Jour. of Med. and Surgery.*

Its value is greatly enhanced by a very copious well-arranged index. We regard this as one of the most valuable contributions to modern surgery. To one entering his novitiate of practice, we regard it the most serviceable guide which he can consult. He will find a fulness of detail leading him through every

step of the operation, and not deserting him until the final issue of the case is decided.—*Sethoscope.*

Embracing, as will be perceived, the whole surgical domain, and each division of itself almost complete and perfect, each chapter full and explicit, each subject faithfully exhibited, we can only express our estimate of it in the aggregate. We consider it an excellent contribution to surgery, as probably the best single volume now extant on the subject, and with great pleasure we add it to our text-books.—*Nashville Journal of Medicine and Surgery.*

Prof. Erichsen's work, for its size, has not been surpassed; his nine hundred and eight pages, profusely illustrated, are rich in physiological, pathological, and operative suggestions, doctrines, details, and processes; and will prove a reliable resource for information, both to physician and surgeon, in the hour of peril.—*N. O. Med. and Surg. Journal.*

FLINT (AUSTIN), M. D.,

Professor of the Theory and Practice of Medicine in the University of Louisville, &amp;c.

**PHYSICAL EXPLORATION AND DIAGNOSIS OF DISEASES AFFECTING THE RESPIRATORY ORGANS.** In one large and handsome octavo volume, extra cloth, 636 pages. \$3 00.

We regard it, in point both of arrangement and of the marked ability of its treatment of the subjects, as destined to take the first rank in works of this class. So far as our information extends, it has at present no equal. To the practitioner, as well as the student, it will be invaluable in clearing up the diagnosis of doubtful cases, and in shedding light upon difficult phenomena.—*Buffalo Med. Journal.*

A work of original observation of the highest merit. We recommend the treatise to every one who wishes to become a correct auscultator. Based to a very large extent upon cases numerically examined, it carries the evidence of careful study and discrimination upon every page. It does credit to the author, and, through him, to the profession in this country. It is, what we cannot call every book upon auscultation, a readable book.—*Am. Jour. Med. Sciences.*

BY THE SAME AUTHOR. (*Now Ready.*)

**A PRACTICAL TREATISE ON THE DIAGNOSIS, PATHOLOGY, AND TREATMENT OF DISEASES OF THE HEART.** In one neat octavo volume, of about 500 pages, extra cloth. \$2 75.

We do not know that Dr. Flint has written anything which is not first rate; but this, his latest contribution to medical literature, in our opinion, surpasses all the others. The work is most comprehensive in its scope, and most sound in the views it enunciates. The descriptions are clear and methodical; the statements are substantiated by facts, and are made with such simplicity and sincerity, that without them they would carry conviction. The style is admirably clear, direct, and free from dryness. With Dr. Walshe's excellent treatise before us, we have no hesitation in saying that Dr. Flint's book is the best work on the heart in the English language.—*Boston Med. and Surg. Journal*, Dec. 15, 1859.

We have thus endeavored to present our readers with a fair analysis of this remarkable work. Preferring to employ the very words of the distinguished author, wherever it was possible, we have essayed to condense into the briefest space a general view of his observations and suggestions, and to direct the attention of our brethren to the abounding stores of valuable matter here collected and arranged for their use and instruction. No medical library will hereafter be considered complete without this volume; and we trust it will promptly find its way into the hands of every American student and physician.—*N. Am. Med. Chir. Review*, Jan. 1860.

This last work of Prof. Flint will add much to his previous well-earned celebrity, as a writer of great force and beauty, and, with his previous work, places him at the head of American writers upon

diseases of the chest. We have adopted his work upon the heart as a text-book, believing it to be more valuable for that purpose than any work of the kind that has yet appeared.—*Nashville Med. Journ.*, Dec. 1859.

With more than pleasure do we hail the advent of this work, for it fills a wide gap on the list of text-books for our schools, and is, for the practitioner, the most valuable practical work of its kind.—*N. O. Med. News*, Nov. 1859.

In regard to the merits of the work, we have no hesitation in pronouncing it full, accurate, and judicious. Considering the present state of science, such a work was much needed. It should be in the hands of every practitioner.—*Chicago Med. Journal*, April, 1860.

But these are very trivial spots, and in no wise prevent us from declaring our most hearty approval of the author's ability, industry, and conscientiousness.—*Dublin Quarterly Journal of Med. Sciences*, Feb. 1860.

He has labored on with the same industry and care, and his place among the first authors of our country is becoming fully established. To this end, the work whose title is given above, contributes in no small degree. Our space will not admit of an extended analysis, and we will close this brief notice by commending it without reserve to every class of readers in the profession.—*Peninsular Med. Journ.*, Feb. 1860.

FOWNES (GEORGE), PH. D., &amp;c.

**A MANUAL OF ELEMENTARY CHEMISTRY; Theoretical and Practical.**

From the seventh revised and corrected London edition. With one hundred and ninety-seven illustrations. Edited by ROBERT BRIDGES, M. D. In one large royal 12mo. volume, of 600 pages. In leather, \$1 65; extra cloth, \$1 50. (*Just Issued.*)

The death of the author having placed the editorial care of this work in the practised hands of Drs. Bence Jones and A. W. Hoffman, everything has been done in its revision which experience could suggest to keep it on a level with the rapid advance of chemical science. The additions requisite to this purpose have necessitated an enlargement of the page, notwithstanding which the work has been increased by about fifty pages. At the same time every care has been used to maintain its distinctive character as a condensed manual for the student, divested of all unnecessary detail or mere theoretical speculation. The additions have, of course, been mainly in the department of Organic Chemistry, which has made such rapid progress within the last few years, but yet equal attention has been bestowed on the other branches of the subject—Chemical Physics and Inorganic Chemistry—to present all investigations and discoveries of importance, and to keep up the reputation of the volume as a complete manual of the whole science, admirably adapted for the learner. By the use of a small but exceedingly clear type the matter of a large octavo is compressed within the convenient and portable limits of a moderate sized duodecimo, and at the very low price affixed, it is offered as one of the cheapest volumes before the profession.

Dr. Fownes' excellent work has been universally recognized everywhere in his own and this country, as the best elementary treatise on chemistry in the English tongue, and is very generally adopted, we believe, as the standard text book in all our colleges, both literary and scientific.—*Charleston Med. Journ. and Review*, Sept. 1859.

A standard manual, which has long enjoyed the reputation of embodying much knowledge in a small space. The author has achieved the difficult task of condensation with masterly tact. His book is concise without being dry, and brief without being too dogmatical or general.—*Virginia Med. and Surgical Journal*.

The work of Dr. Fownes has long been before the public, and its merits have been fully appreciated as the best text-book on chemistry now in existence. We do not, of course, place it in a rank superior to the works of Brande, Graham, Turner, Gregory, or Gmelin, but we say that, as a work for students, it is preferable to any of them.—*London Journal of Medicine*.

A work well adapted to the wants of the student. It is an excellent exposition of the chief doctrines and facts of modern chemistry. The size of the work, and still more the condensed yet perspicuous style in which it is written, absolve it from the charges very properly urged against most manuals termed popular.—*Edinburgh Journal of Medical Science*.

**FISKE FUND PRIZE ESSAYS—THE EFFECTS OF CLIMATE ON TUBERCULOUS DISEASE.** By EDWIN LEE, M. R. C. S., London, and THE INFLUENCE OF PREGNANCY ON THE DEVELOPMENT OF TUBERCLES By

EDWARD WARREN, M. D., of Edenton, N. C. Together in one neat 8vo volume, extra cloth, \$1 00. **FRICK ON RENAL AFFECTIONS;** their Diagnosis and Pathology. With illustrations. One volume, royal 12mo., extra cloth. 75 cents.

FERGUSON (WILLIAM), F. R. S.,

Professor of Surgery in King's College, London, &amp;c.

**A SYSTEM OF PRACTICAL SURGERY.** Fourth American, from the third and enlarged London edition. In one large and beautifully printed octavo volume, of about 700 pages, with 393 handsome illustrations, leather. \$3 00.

GRAHAM (THOMAS), F. R. S.

**THE ELEMENTS OF INORGANIC CHEMISTRY,** including the Applications of the Science in the Arts. New and much enlarged edition, by HENRY WATTS and ROBERT BRIDGES, M. D. Complete in one large and handsome octavo volume, of over 800 very large pages, with two hundred and thirty-two wood-cuts, extra cloth. \$4 00.

\*\*\* Part II., completing the work from p. 431 to end, with Index, Title Matter, &c., may be had separate, cloth backs and paper sides. Price \$2 50.

From Prof. E. N. Horsford, Harvard College.

It has, in its earlier and less perfect editions, been familiar to me, and the excellence of its plan and the clearness and completeness of its discussions, have long been my admiration.

No reader of English works on this science can

afford to be without this edition of Prof. Graham's Elements.—*Silliman's Journal*, March, 1858.

From Prof. Wolcott Gibbs, N. Y. Free Academy.

The work is an admirable one in all respects, and its republication here cannot fail to exert a positive influence upon the progress of science in this country.

GRIFFITH (ROBERT E.), M. D., &amp;c.

**A UNIVERSAL FORMULARY,** containing the methods of Preparing and Administering Official and other Medicines. The whole adapted to Physicians and Pharmacologists. SECOND EDITION, thoroughly revised, with numerous additions, by ROBERT P. THOMAS, M. D., Professor of Materia Medica in the Philadelphia College of Pharmacy. In one large and handsome octavo volume, extra cloth, of 650 pages, double columns. \$3 00; or in sheep, \$3 25.

It was a work requiring much perseverance, and when published was looked upon as by far the best work of its kind that had issued from the American press. Prof. Thomas has certainly "improved," as well as added to this Formulary, and has rendered it additionally deserving of the confidence of pharmacologists and physicians.—*Am. Journal of Pharmacy*.

We are happy to announce a new and improved edition of this one of the most valuable and useful works that have emanated from an American pen. It would do credit to any country, and will be found of daily usefulness to practitioners of medicine; it is better adapted to their purposes than the dispensatories.—*Southern Med. and Surg. Journal*.

It is one of the most useful books a country practitioner can possibly have.—*Medical Chronicle*.

This is a work of six hundred and fifty-one pages, embracing all on the subject of preparing and administering medicines that can be desired by the physician and pharmacist.—*Western Lancet*.

The amount of useful, every-day matter for a practicing physician, is really immense.—*Boston Med. and Surg. Journal*.

This edition has been greatly improved by the revision and ample additions of Dr. Thomas, and is now, we believe, one of the most complete works of its kind in any language. The additions amount to about seventy pages, and no effort has been spared to include in them all the recent improvements. A work of this kind appears to us indispensable to the physician, and there is none we can more cordially recommend.—*N. Y. Journal of Medicine*.



GROSS (SAMUEL D.), M. D.,  
Professor of Surgery in the Jefferson Medical College of Philadelphia, &c.

Just Issued.

**A SYSTEM OF SURGERY: Pathological, Diagnostic, Therapeutic, and Operative.** Illustrated by NINE HUNDRED AND THIRTY-SIX ENGRAVINGS. In two large and beautifully printed octavo volumes, of nearly twenty-four hundred pages; strongly bound in leather, with raised bands. Price \$12.

FROM THE AUTHOR'S PREFACE.

"The object of this work is to furnish a systematic and comprehensive treatise on the science and practice of surgery, considered in the broadest sense; one that shall serve the practitioner as a faithful and available guide in his daily routine of duty. . . . My aim has been to embrace the whole domain of surgery, and to allot to every subject its legitimate claim to notice in the great family of external diseases and accidents. How far this object has been accomplished, it is not for me to determine. It may safely be affirmed, however, that there is no topic, properly appertaining to surgery, that will not be found to be discussed, to a greater or less extent, in these volumes."

Has Dr. Gross satisfactorily fulfilled this object? A careful perusal of his volumes enables us to give an answer in the affirmative. Not only has he given to the reader an elaborate and well-written account of his own vast experience, but he has not failed to embody in his pages the opinions and practice of surgeons in this and other countries of Europe. The result has been a work of such completeness, that it has no superior in the systematic treatises on surgery which have emanated from English or Continental authors. It has been justly objected that these have been far from complete in many essential particulars, many of them having been deficient in some of the most important points which should characterize such works. Some of them have been elaborate—too elaborate—with respect to certain diseases, while they have merely glanced at, or given an unsatisfactory account of, others equally important to the surgeon. Dr. Gross has avoided this error, and has produced the most complete work that has yet issued from the press on the science and practice of surgery. It is not, strictly speaking, a Dictionary of Surgery, but it gives to the reader all the information that he may require for his treatment of surgical diseases. Having said so much, it might appear superfluous to add another word; but it is only due to Dr. Gross to state that he has embraced the opportunity of transferring to his pages a vast number of engravings from English and other authors, illustrative of the pathology and treatment of surgical diseases. To these are added several hundred original wood-cuts. The work altogether commends itself to the attention of British surgeons, from whom it cannot fail to meet with extensive patronage.—*London Lancet*, Sept. 1, 1860.

Of Dr. Gross's treatise on Surgery we can say no more than that it is the most elaborate and complete work on this branch of the healing art which has ever been published in any country. A systematic work, it admits of no analytical review; but, did our space permit, we should gladly give some extracts from it, to enable our readers to judge of the classical style of the author, and the exhausting way in which each subject is treated.—*Dublin Quarterly Journal of Med. Science*.

The work is so superior to its predecessors in matter and extent, as well as in illustrations and

style of publication, that we can honestly recommend it as the best work of the kind to be taken home by the young practitioner.—*Am. Med. Journ.*

The treatise of Prof. Gross is not, therefore, a mere text-book for undergraduates, but a systematic record of more than thirty years' experience, reading, and reflection by a man of observation, sound judgment, and rare practical tact, and as such deserves to take rank with the renowned productions of a similar character, by Vidal and Boyer, of France, or those of Chelius, Blasius, and Lasgenbeck, of Germany. Hence, we do not hesitate to express the opinion that it will speedily take the same elevated position in regard to surgery that has been given by common consent to the masterly work of Pereira in *Materia Medica*, or to Todd and Bowman in *Physiology*.—*N. O. Med. and Surg. Journal*.

At present, however, our object is not to review the work (this we purpose doing hereafter), but simply to announce its appearance, that in the meantime our readers may procure and examine it for themselves. But even this much we cannot do without expressing the opinion that, in putting forth these two volumes, Dr. Gross has reared for himself a lasting monument to his skill as a surgeon, and to his industry and learning as an author.—*St. Louis Med. and Surg. Journal*.

With pleasure we record the completion of this long-anticipated work. The reputation which the author has for many years sustained, both as a surgeon and as a writer, had prepared us to expect a treatise of great excellence and originality; but we confess we were by no means prepared for the work which is before us—the most complete treatise upon surgery ever published, either in this or any other country, and we might, perhaps, safely say, the most original. There is no subject belonging properly to surgery which has not received from the author a due share of attention. Dr. Gross has supplied a want in surgical literature which has long been felt by practitioners; he has furnished us with a complete practical treatise upon surgery in all its departments. As Americans, we are proud of the achievement; as surgeons, we are most sincerely thankful to him for his extraordinary labors in our behalf.—*N. Y. Monthly Review and Buffalo Med. Journal*.

BY THE SAME AUTHOR.

**ELEMENTS OF PATHOLOGICAL ANATOMY.** Third edition, thoroughly revised and greatly improved. In one large and very handsome octavo volume, with about three hundred and fifty beautiful illustrations, of which a large number are from original drawings. Price in extra cloth, \$4 75; leather, raised bands, \$5 25. (*Lately Published.*)

The very rapid advances in the Science of Pathological Anatomy during the last few years have rendered essential a thorough modification of this work, with a view of making it a correct exponent of the present state of the subject. The very careful manner in which this task has been executed, and the amount of alteration which it has undergone, have enabled the author to say that "with the many changes and improvements now introduced, the work may be regarded almost as a new treatise," while the efforts of the author have been seconded as regards the mechanical execution of the volume, rendering it one of the handsomest productions of the American press.

We most sincerely congratulate the author on the successful manner in which he has accomplished his proposed object. His book is most admirably calculated to fill up a blank which has long been felt to exist in this department of medical literature, and as such must become very widely circulated amongst all classes of the profession.—*Dublin Quarterly Journ. of Med. Science*, Nov. 1867.

We have been favorably impressed with the general manner in which Dr. Gross has executed his task of affording a comprehensive digest of the present state of the literature of Pathological Anatomy, and have much pleasure in recommending his work to our readers, as we believe one well deserving of diligent perusal and careful study.—*Montreal Med. Chron.*, Sept. 1867.

BY THE SAME AUTHOR.

**A PRACTICAL TREATISE ON FOREIGN BODIES IN THE AIR-PAS-SAGES.** In one handsome octavo volume, extra cloth, with illustrations. pp. 468. \$2 75.

GROSS (SAMUEL D.), M. D.,

Professor of Surgery in the Jefferson Medical College of Philadelphia, &amp;c.

**A PRACTICAL TREATISE ON THE DISEASES, INJURIES, AND MALFORMATIONS OF THE URINARY BLADDER, THE PROSTATE GLAND, AND THE URETHRA.** Second Edition, revised and much enlarged, with one hundred and eighty-four illustrations. In one large and very handsome octavo volume, of over nine hundred pages. In leather, raised bands, \$5 25; extra cloth, \$4 75.

Philosophical in its design, methodical in its arrangement, ample and sound in its practical details, it may in truth be said to leave scarcely anything to be desired on so important a subject.—*Boston Med. and Surg. Journal*.

Whoever will peruse the vast amount of valuable practical information it contains, will, we think,

agree with us, that there is no work in the English language which can make any just pretensions to be its equal.—*N. Y. Journal of Medicine*.

A volume replete with truths and principles of the utmost value in the investigation of these diseases.—*American Medical Journal*.

GRAY (HENRY), F. R. S.,

Lecturer on Anatomy at St. George's Hospital, London, &amp;c.

**ANATOMY, DESCRIPTIVE AND SURGICAL.** The Drawings by H. V.

CARTER, M. D., late Demonstrator on Anatomy at St. George's Hospital; the Dissections jointly by the AUTHOR and Dr. CARTER. In one magnificent imperial octavo volume, of nearly 800 pages, with 363 large and elaborate engravings on wood. Price in extra cloth, \$6 25; leather raised bands, \$7 00. (*Just Issued.*)

The author has endeavored in this work to cover a more extended range of subjects than is customary in the ordinary text-books, by giving not only the details necessary for the student, but also the application of those details in the practice of medicine and surgery, thus rendering it both a guide for the learner, and an admirable work of reference for the active practitioner. The engravings form a special feature in the work, many of them being the size of nature, nearly all original, and having the names of the various parts printed on the body of the cut, in place of figures of reference with descriptions at the foot. They thus form a complete and splendid series, which will greatly assist the student in obtaining a clear idea of Anatomy, and will also serve to refresh the memory of those who may find in the exigencies of practice the necessity of recalling the details of the dissecting room; while combining, as it does, a complete Atlas of Anatomy, with a thorough treatise on systematic, descriptive, and applied Anatomy, the work will be found of essential use to all physicians who receive students in their offices, relieving both preceptor and pupil of much labor in laying the groundwork of a thorough medical education.

The work before us is one entitled to the highest praise, and we accordingly welcome it as a valuable addition to medical literature. Intermediate in fulness of detail between the treatises of Snarpey and of Wilson, its characteristic merit lies in the number and excellence of the engravings it contains. Most of these are original, of much larger than ordinary size, and admirably executed. The various parts are also lettered after the plan adopted in Holden's Osteology. It would be difficult to over-estimate the advantages offered by this mode of pictorial illustration. Bones, ligaments, muscles, bloodvessels, and nerves are each in turn figured, and marked with their appropriate names; thus enabling the student to comprehend, at a glance, what would otherwise often be ignored, or at any rate, acquired only by prolonged and irksome application. In conclusion, we heartily commend the work of Mr. Gray to the attention of the medical profession, feeling certain that it should be regarded as one of the most valuable contributions ever made to educational literature.—*N. Y. Monthly Review*, Dec. 1859.

In this view, we regard the work of Mr. Gray as far better adapted to the wants of the profession, and especially of the student, than any treatise on anatomy yet published in this country. It is destined, we believe, to supersede all others, both as a manual of dissections, and a standard of reference to the student of general or relative anatomy.—*N. Y. Journal of Medicine*, Nov. 1859.

This is by all comparison the most excellent work on Anatomy extant. It is just the thing that has been long desired by the profession. With such a guide as this, the student of anatomy, the practitioner of medicine, and the surgical devotee have all a newer, clearer, and more radiant light thrown upon the intricacies and mysteries of this wonderful science, and are thus enabled to accomplish results which hitherto seemed possible only to the specialist. The plates, which are copied from recent dissections, are so well executed, that the most superficial observer cannot fail to perceive the positions, relations, and distinctive features of the various parts, and to take in more of anatomy at a glance, than by many long hours of diligent study over the most erudite treatise, or, perhaps, at the dissecting table itself.—*Med. Journ. of N. Carolina*, Oct. 1859.

For this truly admirable work the profession is indebted to the distinguished author of "Gray on the Spleen." The vacancy it fills has been long felt

to exist in this country. Mr. Gray writes throughout with both branches of his subject in view. His description of each particular part is followed by a notice of its relations to the parts with which it is connected, and this, too, sufficiently ample for all the purposes of the operative surgeon. After describing the bones and muscles, he gives a concise statement of the fractures to which the bones of the extremities are most liable, together with the amount and direction of the displacement to which the fragments are subjected by muscular action. The section on arteries is remarkably full and accurate. Not only is the surgical anatomy given to every important vessel, with directions for its ligation, but at the end of the description of each arterial trunk we have a useful summary of the irregularities which may occur in its origin, course, and termination.—*N. A. Med. Chir. Review*, Mar. 1859.

Mr. Gray's book, in excellency of arrangement and completeness of execution, exceeds any work on anatomy hitherto published in the English language, affording a complete view of the structure of the human body, with especial reference to practical surgery. Thus the volume constitutes a perfect book of reference for the practitioner, demanding a place in even the most limited library of the physician or surgeon, and a work of necessity for the student to fix in his mind what he has learned by the dissecting knife from the book of nature.—*The Dublin Quarterly Journal of Med. Sciences*, Nov. 1858.

In our judgment, the mode of illustration adopted in the present volume cannot but present many advantages to the student of anatomy. To the zealous disciple of Vesalius, earnestly desirous of real improvement, the book will certainly be of immense value; but, at the same time, we must also confess that to those simply desirous of "cramming" it will be an undoubted godsend. The peculiar value of Mr. Gray's mode of illustration is nowhere more markedly evident than in the chapter on osteology, and especially in those portions which treat of the bones of the head and of their development. The study of these parts is thus made one of comparative ease, if not of positive pleasure; and those bugbears of the student, the temporal and sphenoid bones, are shorn of half their terrors. It is, in our estimation, an admirable and complete text-book for the student, and a useful work of reference for the practitioner; its pictorial character forming a novel element, to which we have already sufficiently alluded.—*Am. Journ. Med. Sci.*, July, 1859.

**GIBSON'S INSTITUTES AND PRACTICE OF SURGERY.** Eighth edition, improved and altered. With thirty-four plates. In two handsome octavo volumes, containing about 1,000 pages, leather, raised band. \$6 50.

**GARDNER'S MEDICAL CHEMISTRY,** for the use of Students and the Profession. In one royal 12mo. vol., cloth, pp. 396, with wood-cuts. \$1.

**GLUGE'S ATLAS OF PATHOLOGICAL HISTOLOGY.** Translated, with Notes and Addi-

tions, by JOSEPH LEIDY, M. D. In one volume, very large imperial quarto, extra cloth, with 320 copper-plate figures, plain and colored, \$5 00.

**HUGHES' INTRODUCTION TO THE PRACTICE OF AUSCULTATION AND OTHER MODES OF PHYSICAL DIAGNOSIS. IN DISEASES OF THE LUNGS AND HEART.** Second edition. 1 vol. royal 12mo., ex. cloth, pp. 304. \$1 00.

**HAMILTON (FRANK H.), M. D.,**  
Professor of Surgery in the Long Island College Hospital.

**A PRACTICAL TREATISE ON FRACTURES AND DISLOCATIONS.** In one large and handsome octavo volume, of over 750 pages, with 289 illustrations. \$4 25. (*New Ready*, January, 1860.)

Among the many good workers at surgery of whom America may now boast not the least is Frank Hastings Hamilton; and the volume before us is (we say it with a pang of wounded patriotism) the best and handiest book on the subject in the English language. It is in vain to attempt a review of it; nearly as vain to seek for any sins, either of commission or omission. We have seen no work on practical surgery which we would sooner recommend to our brother surgeons, especially those of "the services," or those whose practice lies in districts where a man has necessarily to rely on his own unaided resources. The practitioner will find in it directions for nearly every possible accident, easily found and comprehended; and much pleasant reading for him to muse over in the after consideration of his cases.—*Edinburgh Med. Journ.* Feb. 1861.

This is a valuable contribution to the surgery of most important affections, and is the more welcome, inasmuch as at the present time we do not possess a single complete treatise on Fractures and Dislocations in the English language. It has remained for our American brother to produce a complete treatise upon the subject, and bring together in a convenient form those alterations and improvements that have been made from time to time in the treatment of these affections. One great and valuable feature in the work before us is the fact that it comprises all the improvements introduced into the practice of both English and American surgery, and though far from omitting mention of our continental neighbors, the author by no means encourages the notion—but too prevalent in some quarters—that nothing is good unless imported from France or Germany. The latter half of the work is devoted to the consideration of the various dislocations and their appropriate treatment, and its merit is fully equal to that of the preceding portion.—*The London Lancet*, May 5, 1860.

It is emphatically the book upon the subjects of which it treats, and we cannot doubt that it will continue so to be for an indefinite period of time. When we say, however, that we believe it will at once take its place as the best book for consultation by the practitioner; and that it will form the most complete, available, and reliable guide in emergencies of every nature connected with its subjects; and also that the student of surgery may make it his textbook with entire confidence, and with pleasure also, from its agreeable and easy style—we think our own

opinion may be gathered as to its value.—*Boston Medical and Surgical Journal*, March 1, 1860.

The work is concise, judicious, and accurate, and adapted to the wants of the student, practitioner, and investigator, honorable to the author and to the profession.—*Chicago Med. Journal*, March, 1860.

We regard this work as an honor not only to its author, but to the profession of our country. Were we to review it thoroughly, we could not convey to the mind of the reader more forcibly our honest opinion expressed in the few words—we think it the best book of its kind extant. Every man interested in surgery will soon have this work on his desk. He who does not, will be the loser.—*New Orleans Medical News*, March, 1860.

Now that it is before us, we feel bound to say that much as was expected from it, and onerous as was the undertaking, it has surpassed expectation, and achieved more than was pledged in its behalf; for its title does not express in full the richness of its contents. On the whole, we are prouder of this work than of any which has for years emanated from the American medical press; its sale will certainly be very large in this country, and we anticipate its eliciting much attention in Europe.—*Nashville Medical Record*, Mar. 1860.

Every surgeon, young and old, should possess himself of it, and give it a careful perusal, in doing which he will be richly repaid.—*St. Louis Med. and Surg. Journal*, March, 1860.

Dr. Hamilton is fortunate in having succeeded in filling the void, so long felt, with what cannot fail to be at once accepted as a model monograph in some respects, and a work of classical authority. We sincerely congratulate the profession of the United States on the appearance of such a publication from one of their number. We have reason to be proud of it as an original work, both in a literary and scientific point of view, and to esteem it as a valuable guide in a most difficult and important branch of study and practice. On every account, therefore, we hope that it may soon be widely known abroad as an evidence of genuine progress on this side of the Atlantic, and further, that it may be still more widely known at home as an authoritative teacher from which every one may profitably learn, and as affording an example of honest, well-directed, and untiring industry in authorship which every surgeon may emulate.—*Am. Med. Journal*, April, 1860.

**HOBLYN (RICHARD D.), M. D.**

**A DICTIONARY OF THE TERMS USED IN MEDICINE AND THE COLLATERAL SCIENCES.** A new American edition. Revised, with numerous additions, by ISAAC HAYS, M. D., editor of the "American Journal of the Medical Sciences." In one large royal 12mo. volume, leather, of over 500 double columned pages. \$1 50.

To both practitioner and student, we recommend this dictionary as being convenient in size, accurate in definition, and sufficiently full and complete for ordinary consultation.—*Charleston Med. Journ.*

We know of no dictionary better arranged and adapted. It is not encumbered with the obsolete terms of a bygone age, but it contains all that are now in

use; embracing every department of medical science down to the very latest date.—*Western Lancet*.

Hoblyn's Dictionary has long been a favorite with us. It is the best book of definitions we have, and ought always to be upon the student's table.—*Southern Med. and Surg. Journal*.

**HOLLAND'S MEDICAL NOTES AND REFLECTIONS.** From the third London edition. In one handsome octavo volume, extra cloth. \$3.  
**HORNER'S SPECIAL ANATOMY AND HIS-**

**TOLOGY.** Eighth edition. Extensively revised and modified. In two large octavo volumes, extra cloth, of more than 1000 pages, with over 300 illustrations. \$6 00.

HODGE (HUGH L.), M. D.,

Professor of Midwifery and the Diseases of Women and Children in the University of Pennsylvania, &amp;c.

**ON DISEASES PECULIAR TO WOMEN**, including Displacements of the Uterus. With original illustrations. In one beautifully printed octavo volume, of nearly 500 pages, extra cloth. \$3 25. (*Now Ready.*)

We will say at once that the work fulfils its object capitally well; and we will moreover venture the assertion that it will inaugurate an improved practice throughout this whole country. The secrets of the author's success are so clearly revealed that the attentive student cannot fail to insure a goodly portion of similar success in his own practice. It is a credit to all medical literature; and we add, that the physician who does not place it in his library, and who does not faithfully con its pages, will lose a vast deal of knowledge that would be most useful to himself and beneficial to his patients. *It is a practical work of the highest order of merit; and it will take rank as such immediately.*—*Maryland and Virginia Medical Journal*, Feb. 1861.

This contribution towards the elucidation of the pathology and treatment of some of the diseases peculiar to women, cannot fail to meet with a favorable reception from the medical profession. The character of the particular maladies of which the work before us treats; their frequency, variety, and obscurity; the amount of malaise and even of actual suffering by which they are invariably attended; their obstinacy, the difficulty with which they are overcome, and their disposition again and again to recur—these, taken in connection with the entire competency of the author to render a correct account of their nature, their causes, and their appropriate management—his ample experience, his matured judgment, and his perfect conscientiousness—invest this publication with an interest and value to which few of the medical treatises of a recent date can lay a stronger, if, perchance, an equal claim.—*Am. Journ. Med. Sciences*, Jan. 1861.

Indeed, although no part of the volume is not eminently deserving of perusal and study, we think that the nine chapters devoted to this subject, are especially so, and we know of no more valuable monograph upon the symptoms, prognosis, and management of these annoying maladies than is constituted by this part of the work. We cannot but regard it as one of the most original and most practical works of the day; one which every accoucheur and physician should most carefully read; for we are persuaded that he will arise from its perusal with new ideas, which will induct him into a more rational practice in regard to many a suffering female, who may have placed her health in his hands.—*British American Journal*, Feb. 1861.

Of the many excellences of the work we will not speak at length. We advise all who would acquire a knowledge of the proper management of the maladies of which it treats, to study it with care. The second part is of itself a most valuable contribution to the practice of our art.—*Am. Med. Monthly and New York Review*, Feb. 1861.

The illustrations, which are all original, are drawn to a uniform scale of one-half the natural size.

HABERSHON (S. O.), M. D.,

Assistant Physician to and Lecturer on Materia Medica and Therapeutics at Guy's Hospital, &amp;c.

**PATHOLOGICAL AND PRACTICAL OBSERVATIONS ON DISEASES OF THE ALIMENTARY CANAL, ŒSOPHAGUS, STOMACH, CÆCUM, AND INTES-TINES.** With illustrations on wood. In one handsome octavo volume of 312 pages, extra cloth \$1 75. (*Now Ready.*)

JONES (T. WHARTON), F. R. S.,

Professor of Ophthalmic Medicine and Surgery in University College, London, &amp;c.

**THE PRINCIPLES AND PRACTICE OF OPHTHALMIC MEDICINE AND SURGERY.** With one hundred and ten illustrations. Second American from the second and revised London edition, with additions by EDWARD HARTSHORNE, M. D., Surgeon to Wills' Hospital, &c. In one large, handsome royal 12mo. volume, extra cloth, of 500 pages. \$1 50.

**JONES (C. HANDFIELD), F. R. S., & EDWARD H. SIEVEKING, M. D.,**  
Assistant Physicians and Lecturers in St. Mary's Hospital, London.

**A MANUAL OF PATHOLOGICAL ANATOMY.** First American Edition, Revised. With three hundred and ninety-seven handsome wood engravings. In one large and beautiful octavo volume of nearly 750 pages, leather. \$3 75.

As a concise text-book, containing, in a condensed form, a complete outline of what is known in the domain of Pathological Anatomy, it is perhaps the best work in the English language. Its great merit consists in its completeness and brevity, and in this respect it supplies a great desideratum in our literature. Heretofore the student of pathology was

obliged to glean from a great number of monographs; and the field was so extensive that but few cultivated it with any degree of success. As a simple work of reference, therefore, it is of great value to the student of pathological anatomy, and should be in every physician's library.—*Western Lancet*.

KIRKES (WILLIAM SENHOUSE), M. D.,

Demonstrator of Morbid Anatomy at St. Bartholomew's Hospital, &amp;c.

**A MANUAL OF PHYSIOLOGY.** A new American, from the third and improved London edition. With two hundred illustrations. In one large and handsome royal 12mo. volume, leather. pp. 586. \$2 00. (*Lately Published.*)

This is a new and very much improved edition of Dr. Kirkes' well-known Handbook of Physiology. It combines conciseness with completeness, and is, therefore, admirably adapted for consultation by the busy practitioner.—*Dublin Quarterly Journal*.

One of the very best handbooks of Physiology now possesses—presenting in a concise as the student upon a course of preparing for a Its excellence

and its carefully cited authorities. It is the most convenient of text-books. These gentlemen, Messrs. Kirkes and Paget, have the gift of telling us what we want to know, without thinking it necessary to tell us all they know.—*Boston Med. and Surg. Journal*.

udent beginning this study, and the who has but leisure to refresh his mind is invaluable, as it contains all to know.—*Charleston Med.*

**KNAPP'S TECHNOLOGY**; or, Chemistry applied to the Arts and to Manufactures. Edited by Dr. RONALDS, Dr. RICHARDSON, and Prof. W. R. JOHNSON. In two handsome 8vo. vols., with about 500 wood-engravings. \$6 00.

**LAYCOCK'S LECTURES ON THE PRINCIPLES AND METHODS OF MEDICAL OBSERVATION AND RESEARCH.** For the Use of Advanced Students and Junior Practitioners. In one royal 12mo. volume, extra cloth. Price \$1.

#### LALLEMAND AND WILSON.

**A PRACTICAL TREATISE ON THE CAUSES, SYMPTOMS, AND TREATMENT OF SPERMATORRHOEA.** By M. LALLEMAND. Translated and edited by HENRY J. McDUGALL. Third American edition. To which is added — **ON DISEASES OF THE VESICULÆ SEMINALES; AND THEIR ASSOCIATED ORGANS.** With special reference to the Morbid Secretions of the Prostatic and Urethral Mucous Membrane. By MARRIS WILSON, M. D. In one neat octavo volume, of about 400 pp., extra cloth. \$2 00. (*Just Issued.*)

#### LA ROCHE (R.), M. D., &c.

**YELLOW FEVER**, considered in its Historical, Pathological, Etiological, and Therapeutical Relations. Including a Sketch of the Disease as it has occurred in Philadelphia from 1699 to 1854, with an examination of the connections between it and the fevers known under the same name in other parts of temperate as well as in tropical regions. In two large and handsome octavo volumes of nearly 1500 pages, extra cloth. \$7 00.

From Professor S. H. Dickson, Charleston, S. C., September 18, 1855.

A monument of intelligent and well applied research, almost without example. It is, indeed, in itself, a large library, and is destined to constitute the special resort as a book of reference, in the subject of which it treats, to all future time.

We have not time at present, engaged as we are, by day and by night, in the work of combating this very disease, now prevailing in our city, to do more than give this cursory notice of what we consider as undoubtedly the most able and erudite medical publication our country has yet produced. But in view of the startling fact, that this, the most malig-

nant and unmanageable disease of modern times, has for several years been prevailing in our country to a greater extent than ever before; that it is no longer confined to either large or small cities, but penetrates country villages, plantations, and farm-houses; that it is treated with scarcely better success now than thirty or forty years ago; that there is vast mischief done by ignorant pretenders to knowledge in regard to the disease, and in view of the probability that a majority of southern physicians will be called upon to treat the disease, we trust that this able and comprehensive treatise will be very generally read in the south.—*Memphis Med. Recorder.*

#### BY THE SAME AUTHOR.

**PNEUMONIA**; its Supposed Connection, Pathological and Etiological, with Autumnal Fevers, including an Inquiry into the Existence and Morbid Agency of Malaria. In one handsome octavo volume, extra cloth, of 500 pages. \$3 00.

#### LAWRENCE (W.), F. R. S., &c.

**A TREATISE ON DISEASES OF THE EYE.** A new edition, edited, with numerous additions, and 243 illustrations, by ISAAC HAYS, M. D., Surgeon to Will's Hospital, &c. In one very large and handsome octavo volume, of 950 pages, strongly bound in leather with raised bands. \$5 00.

#### LUDLOW (J. L.), M. D.

**A MANUAL OF EXAMINATIONS** upon Anatomy, Physiology, Surgery, Practice of Medicine, Obstetrics, Materia Medica, Chemistry, Pharmacy, and Therapeutics. To which is added a Medical Formulary. Third edition, thoroughly revised and greatly extended and enlarged. With 370 illustrations. In one handsome royal 12mo. volume, leather, of 816 large pages. \$2 50.

We know of no better companion for the student during the hours spent in the lecture room, or to refresh, at a glance, his memory of the various topics

crammed into his head by the various professors to whom he is compelled to listen.—*Western Lancet*, May, 1857.

#### LEHMANN (C. G.)

**PHYSIOLOGICAL CHEMISTRY.** Translated from the second edition by GEORGE E. DAY, M. D., F. R. S., &c., edited by R. E. ROGERS, M. D., Professor of Chemistry in the Medical Department of the University of Pennsylvania, with illustrations selected from Funke's Atlas of Physiological Chemistry, and an Appendix of plates. Complete in two large and handsome octavo volumes, extra cloth, containing 1200 pages, with nearly two hundred illustrations. \$6 00.

The work of Lehmann stands unrivalled as the most comprehensive book of reference and information extant on every branch of the subject on which it treats.—*Edinburgh Journal of Medical Science.*

The most important contribution as yet made to Physiological Chemistry.—*Am. Journal Med. Sciences*, Jan. 1856.

#### BY THE SAME AUTHOR. (*Lately Published.*)

**MANUAL OF CHEMICAL PHYSIOLOGY.** Translated from the German, with Notes and Additions, by J. CHESTON MORRIS, M. D., with an Introductory Essay on Vital Force, by Professor SAMUEL JACKSON, M. D., of the University of Pennsylvania. With illustrations on wood. In one very handsome octavo volume, extra cloth, of 336 pages. \$2 25.

#### From Prof. Jackson's Introductory Essay.

In adopting the handbook of Dr. Lehmann as a manual of Organic Chemistry for the use of the students of the University, and in recommending his original work of **PHYSIOLOGICAL CHEMISTRY** for their more mature studies, the high value of his researches, and the great weight of his authority in that important department of medical science are fully recognized.

LYONS (ROBERT D.), K. C. C.,

Late Pathologist in-chief to the British Army in the Crimea, &c.

**A TREATISE ON FEVER; or, selections from a course of Lectures on Fever.** Being part of a course of Theory and Practice of Medicine. In one neat octavo volume, of 362 pages, extra cloth; \$2 00. (*Now Ready.*)

*From the Author's Preface.*

"I am induced to publish this work on Fever with a view to bring within the reach of the student and junior practitioner, in a convenient form, the more recent results of inquiries into the Pathology and Therapeutics of this formidable class of diseases.

"The works of the great writers on Fever are so numerous, and in the present day are scattered in so many languages, that they are difficult of access, not only to students but also to practitioners. I shall deem myself fortunate if I can in any measure supply the want which is felt in this respect.

We have great pleasure in recommending Dr. Lyons' work on *Fever* to the attention of the profession. It is a work which cannot fail to enhance the author's previous well-earned reputation, as a diligent, careful, and accurate observer.—*British Med. Journal*, March 2, 1861.

Taken as a whole we can recommend it in the highest terms as well worthy the careful perusal and study of every student and practitioner of medi-

cine. We consider the work a most valuable addition to medical literature, and one destined to wield no little influence over the mind of the profession.—*Med. and Surg. Reporter*, May 4, 1861.

This is an admirable work upon the most remarkable and most important class of diseases to which mankind are liable.—*Med. Journ. of N. Carolina*, May, 1861.

MEIGS (CHARLES D.), M. D.,

Professor of Obstetrics, &c. in the Jefferson Medical College, Philadelphia.

**OBSTETRICS: THE SCIENCE AND THE ART.** Third edition, revised and improved. With one hundred and twenty-nine illustrations. In one beautifully printed octavo volume, leather, of seven hundred and fifty-two large pages. \$3 75.

Though the work has received only five pages of enlargement, its chapters throughout wear the impress of careful revision. Expunging and rewriting, remodelling its sentences, with occasional new material, all evince a lively desire that it shall deserve to be regarded as improved in *manner* as well as *matter*. In the *matter*, every stroke of the pen has increased the value of the book, both in expungings and additions.—*Western Lancet*, Jan. 1857.

The best American work on Midwifery that is accessible to the student and practitioner.—*N. W. Med. and Surg. Journal*, Jan. 1857.

This is a standard work by a great American Obstetrician. It is the third and last edition, and, in the language of the preface, the author has "brought the subject up to the latest dates of real improvement in our art and Science."—*Nashville Journ. of Med. and Surg.*, May, 1857.

BY THE SAME AUTHOR. (*Just Issued.*)

**WOMAN: HER DISEASES AND THEIR REMEDIES.** A Series of Lectures to his Class. Fourth and Improved edition. In one large and beautifully printed octavo volume, leather, of over 700 pages. \$3 60.

In other respects, in our estimation, too much cannot be said in praise of this work. It abounds with beautiful passages, and for conciseness, for originality, and for all that is commendable in a work on the diseases of females, it is not excelled, and probably not equalled in the English language. On the whole, we know of no work on the diseases of women which we can so cordially commend to the student and practitioner as the one before us.—*Ohio Med. and Surg. Journal*.

The body of the book is worthy of attentive consideration, and is evidently the production of a clever, thoughtful, and sagacious physician. Dr. Meigs's letters on the diseases of the external organs, contain many interesting and rare cases, and many instructive observations. We take our leave of Dr. Meigs, with a high opinion of his talents and originality.—*The British and Foreign Medico-Chirurgical Review*.

Every chapter is replete with practical instruction, and bears the impress of being the composition of an acute and experienced mind. There is a terseness, and at the same time an accuracy in his description of symptoms, and in the rules for diagnosis,

which cannot fail to recommend the volume to the attention of the reader.—*Ranking's Abstract*.

It contains a vast amount of practical knowledge, by one who has accurately observed and retained the experience of many years.—*Dublin Quarterly Journal*.

Full of important matter, conveyed in a ready and agreeable manner.—*St. Louis Med. and Surg. Jour.*

There is an off-hand fervor, a glow, and a warm-heartedness infecting the effort of Dr. Meigs, which is entirely captivating, and which absolutely hurries the reader through from beginning to end. Besides, the book teems with solid instruction, and it shows the very highest evidence of ability, viz., the clearness with which the information is presented. We know of no better test of one's understanding a subject than the evidence of the power of lucidly explaining it. The most elementary, as well as the obscurest subjects, under the pencil of Prof. Meigs, are isolated and made to stand out in such bold relief, as to produce distinct impressions upon the mind and memory of the reader.—*The Charleston Med. Journal*.

BY THE SAME AUTHOR.

**ON THE NATURE, SIGNS, AND TREATMENT OF CHILD BED FEVER.** In a Series of Letters addressed to the Students of his Class. In one handsome octavo volume, extra cloth, of 365 pages. \$2 50.

The instructive and interesting author of this work, whose previous labors have placed his countrymen under deep and abiding obligations, again challenges their admiration in the fresh and vigorous, attractive and racy pages before us. It is a de-

lectable book. \* \* \* This treatise upon child-bed fevers will have an extensive sale, being destined, as it deserves, to find a place in the library of every practitioner who scorns to lag in the rear.—*Nashville Journal of Medicine and Surgery*.

BY THE SAME AUTHOR; WITH COLORED PLATES.

**A TREATISE ON ACUTE AND CHRONIC DISEASES OF THE NECK OF THE UTERUS.** With numerous plates, drawn and colored from nature in the highest style of art. In one handsome octavo volume, extra cloth. \$4 50.

## MACLISE (JOSEPH), SURGEON.

**SURGICAL ANATOMY.** Forming one volume, very large imperial quarto.

With sixty-eight large and splendid Plates, drawn in the best style and beautifully colored. Containing one hundred and ninety Figures, many of them the size of life. Together with copious and explanatory letter-press. Strongly and handsomely bound in extra cloth, being one of the cheapest and best executed Surgical works as yet issued in this country. \$11 00.

\*.\* The size of this work prevents its transmission through the post-office as a whole, but those who desire to have copies forwarded by mail, can receive them in five parts, done up in stout wrappers. Price \$9 00.

One of the greatest artistic triumphs of the age in Surgical Anatomy.—*British American Medical Journal*.

No practitioner whose means will admit should fail to possess it.—*Ranking's Abstract*.

Too much cannot be said in its praise; indeed, we have not language to do it justice.—*Ohio Medical and Surgical Journal*.

The most accurately engraved and beautifully colored plates we have ever seen in an American book—one of the best and cheapest surgical works ever published.—*Buffalo Medical Journal*.

It is very rare that so elegantly printed, so well illustrated, and so useful a work, is offered at so moderate a price.—*Charleston Medical Journal*.

Its plates can boast a superiority which places them almost beyond the reach of competition.—*Medical Examiner*.

Country practitioners will find these plates of immense value.—*N. Y. Medical Gazette*.

A work which has no parallel in point of accuracy and cheapness in the English language.—*N. Y. Journal of Medicine*.

We are extremely gratified to announce to the profession the completion of this truly magnificent work, which, as a whole, certainly stands unrivalled, both for accuracy of drawing, beauty of coloring, and all the requisite explanations of the subject in hand.—*The New Orleans Medical and Surgical Journal*.

This is by far the ablest work on Surgical Anatomy that has come under our observation. We know of no other work that would justify a student, in any degree, for neglect of actual dissection. In those sudden emergencies that so often arise, and which require the instantaneous command of minute anatomical knowledge, a work of this kind keeps the details of the dissecting-room perpetually fresh in the memory.—*The Western Journal of Medicine and Surgery*.

## MILLER (HENRY), M. D.,

Professor of Obstetrics and Diseases of Women and Children in the University of Louisville.

**PRINCIPLES AND PRACTICE OF OBSTETRICS, &c.;** including the Treatment of Chronic Inflammation of the Cervix and Body of the Uterus considered as a frequent cause of Abortion. With about one hundred illustrations on wood. In one very handsome octavo volume, of over 600 pages. (*Lately Published.*) \$3 75.

We congratulate the author that the task is done. We congratulate him that he has given to the medical public a work which will secure for him a high and permanent position among the standard authorities on the principles and practice of obstetrics. Congratulations are not less due to the medical profession of this country, on the acquisition of a treatise embodying the results of the studies, reflections, and experience of Prof. Miller. Few men, if any, in this country, are more competent than he to write on this department of medicine. Engaged for thirty-five years in an extended practice of obstetrics, for many years a teacher of this branch of instruction in one of the largest of our institutions, a diligent student as well as a careful observer, an original and independent thinker, wedded to no hobbies, ever ready to consider without prejudice new views, and to adopt innovations if they are really improvements, and withal a clear, agreeable writer, a practical treatise from his pen could not fail to possess great value.—*Buffalo Med Journal*.

In fact, this volume must take its place among the standard systematic treatises on obstetrics; a posi-

tion to which its merits justly entitle it. The style is such that the descriptions are clear, and each subject is discussed and elucidated with due regard to its practical bearings, which cannot fail to make it acceptable and valuable to both students and practitioners. We cannot, however, close this brief notice without congratulating the author and the profession on the production of such an excellent treatise. The author is a western man of whom we feel proud, and we cannot but think that his book will find many readers and warm admirers wherever obstetrics is taught and studied as a science and an art.—*The Cincinnati Lancet and Observer*.

A most respectable and valuable addition to our home medical literature, and one reflecting credit alike on the author and the institution to which he is attached. The student will find in this work a most useful guide to his studies; the country practitioner, rusty in his reading, can obtain from its pages a fair résumé of the modern literature of the science; and we hope to see this American production generally consulted by the profession.—*Va. Med. Journal*.

## MACKENZIE (W.), M. D.,

Surgeon Oculist in Scotland in ordinary to Her Majesty, &c. &c.

**A PRACTICAL TREATISE ON DISEASES AND INJURIES OF THE**

**EYE.** To which is prefixed an Anatomical Introduction explanatory of a Horizontal Section of the Human Eyeball, by THOMAS WHARTON JONES, F. R. S. From the Fourth Revised and Enlarged London Edition. With Notes and Additions by ADDINELL HEWSON, M. D., Surgeon to Wills Hospital, &c. &c. In one very large and handsome octavo volume, leather, raised bands, with plates and numerous wood-cuts. \$5 25.

The treatise of Dr. Mackenzie indisputably holds the first place, and forms, in respect of learning and research, an Encyclopedia unequalled in extent by any other work of the kind, either English or foreign.—*Dixon on Diseases of the Eye*.

Few modern books on any department of medicine or surgery have met with such extended circulation, or have procured for their authors a like amount of European celebrity. The immense research which it displayed, the thorough acquaintance with the subject, practically as well as theoretically, and the

able manner in which the author's stores of learning and experience were rendered available for general use, at once procured for the first edition, as well on the continent as in this country, that high position as a standard work which each successive edition has more firmly established. We consider it the duty of every one who has the love of his profession and the welfare of his patient at heart, to make himself familiar with this the most complete work in the English language upon the diseases of the eye.—*Med. Times and Gazette*.

**MAYNE'S DISPENSATORY AND THERAPEUTICAL REMEMBRANCER.** With every Practical Formula contained in the three British Pharmacopœias. Edited, with the addition of the *Formulæ of the U. S. Pharmacopœia*, by R. E. GRIFFITH, M. D. 12mo. vol. ex. cl., 300 pp. 75 c.

**MALGAIGNE'S OPERATIVE SURGERY,** based on Normal and Pathological Anatomy. Translated from the French by FREDERICK BRITTON, A. B., M. D. With numerous illustrations on wood. In one handsome octavo volume, extra cloth, of nearly six hundred pages. \$3 25.

MILLER (JAMES), F. R. S. E.,

Professor of Surgery in the University of Edinburgh, &amp;c.

**PRINCIPLES OF SURGERY.** Fourth American, from the third and revised Edinburgh edition. In one large and very beautiful volume, leather, of 700 pages, with two hundred and forty illustrations on wood. \$3 75.

The work of Mr. Miller is too well and too favorably known among us, as one of our best text-books, to render any further notice of it necessary than the announcement of a new edition, the *fourth* in our country, a proof of its extensive circulation among us. As a concise and reliable exposition of the science of modern surgery, it stands deservedly high—we know not its superior.—*Boston Med. and Surg. Journal*.

The work takes rank with Watson's Practice of Physic; it certainly does not fall behind that great work in soundness of principle or depth of reasoning and research. No physician who values his reputation, or seeks the interests of his clients, can acquit himself before his God and the world without making himself familiar with the sound and philosophical views developed in the foregoing book.—*New Orleans Med. and Surg. Journal*.

BY THE SAME AUTHOR. (Just Issued.)

**THE PRACTICE OF SURGERY.** Fourth American from the last Edinburgh edition. Revised by the American editor. Illustrated by three hundred and sixty-four engravings on wood. In one large octavo volume, leather, of nearly 700 pages. \$3 75.

No eulogium of ours could add to the popularity of Miller's Surgery. Its reputation in this country is unsurpassed by that of any other work, and, when taken in connection with the author's *Principles of Surgery*, constitutes a whole, without reference to which no conscientious surgeon would be willing to practice his art.—*Southern Med. and Surg. Journal*.

It is seldom that two volumes have ever made so profound an impression in so short a time as the "Principles" and the "Practice" of Surgery by Mr. Miller—or so richly merited the reputation they have acquired. The author is an eminently sensible, practical, and well-informed man, who knows exactly what he is talking about and exactly how to talk it.—*Kentucky Medical Recorder*.

By the almost unanimous voice of the profession,

his works, both on the principles and practice of surgery have been assigned the highest rank. If we were limited to but one work on surgery, that one should be Miller's, as we regard it as superior to all others.—*St. Louis Med. and Surg. Journal*.

The author has in this and his "Principles," presented to the profession one of the most complete and reliable systems of Surgery extant. His style of writing is original, impressive, and engaging, energetic, concise, and lucid. Few have the faculty of condensing so much in small space, and at the same time so persistently holding the attention. Whether as a text-book for students or a book of reference for practitioners, it cannot be too strongly recommended.—*Southern Journal of Med. and Physical Sciences*.

MORLAND (W. W.), M. D.,

Fellow of the Massachusetts Medical Society, &amp;c.

**DISEASES OF THE URINARY ORGANS; a Compendium of their Diagnosis, Pathology, and Treatment.** With illustrations. In one large and handsome octavo volume, of about 600 pages, extra cloth. (Just Issued.) \$3 50.

Taken as a whole, we can recommend Dr. Morland's compendium as a very desirable addition to the library of every medical or surgical practitioner.—*Brit. and For. Med.-Chir. Rev.*, April, 1859.

Every medical practitioner whose attention has been to any extent attracted towards the class of diseases to which this treatise relates, must have often and sorely experienced the want of some full, yet concise recent compendium to which he could refer. This desideratum has been supplied by Dr. Morland, and it has been ably done. He has placed before us a full, judicious, and reliable digest. Each subject is treated with sufficient minuteness,

yet in a succinct, narrational style, such as to render the work one of great interest, and one which will prove in the highest degree useful to the general practitioner. To the members of the profession in the country it will be peculiarly valuable, on account of the characteristics which we have mentioned, and the one broad aim of practical utility which is kept in view, and which shines out upon every page, together with the skill which is evinced in the combination of this grand requisite with the utmost brevity which a just treatment of the subjects would admit.—*N. Y. Journ. of Medicine*, Nov. 1858.

MONTGOMERY (W. F.), M. D., M. R. I. A., &amp;c.,

Professor of Midwifery in the King and Queen's College of Physicians in Ireland, &amp;c.

**AN EXPOSITION OF THE SIGNS AND SYMPTOMS OF PREGNANCY.**

With many other Papers on Subjects connected with Midwifery. From the second and enlarged English edition. With two exquisite colored plates, and numerous wood-cuts. In one very handsome octavo volume, extra cloth, of nearly 600 pages. (Lately Published.) \$3 75.

A book unusually rich in practical suggestions.—*Am. Journal Med. Sciences*, Jan. 1857.

These several subjects so interesting in themselves, and so important, every one of them, to the most delicate and precious of social relations, controlling often the honor and domestic peace of a family, the legitimacy of offspring, or the life of its parent, are all treated with an elegance of diction, fulness of illustrations, acuteness and justice of reasoning, unparalleled in obstetrics, and unsurpassed in medicine. The reader's interest can never flag, so fresh, and vigorous, and classical is our author's style; and one forgets, in the renewed charm of every page, that it, and every line, and every word

has been weighed and reweighed through years of preparation; that this is of all others the book of Obstetric Law, on each of its several topics; on all points connected with pregnancy, to be everywhere received as a manual of special jurisprudence, at once announcing fact, affording argument, establishing precedent, and governing alike the jurymen, advocate, and judge. It is not merely in its legal relations that we find this work so interesting. Hardly a page but that has its hints or facts important to the general practitioner; and not a chapter without especial matter for the anatomist, physiologist, or pathologist.—*N. A. Med.-Chir. Review*, March, 1857.

MOHR (FRANCIS), PH. D., AND REDWOOD (THEOPHILUS).

**PRACTICAL PHARMACY.** Comprising the Arrangements, Apparatus, and Manipulations of the Pharmaceutical Shop and Laboratory. Edited, with extensive Additions, by Prof. WILLIAM PROCTER, of the Philadelphia College of Pharmacy. In one handsomely printed octavo volume, extra cloth, of 570 pages, with over 500 engravings on wood. \$2 75.



NEILL (JOHN), M. D.,

Surgeon to the Pennsylvania Hospital, &amp;c.; and

FRANCIS GURNEY SMITH, M. D.,

Professor of Institutes of Medicine in the Pennsylvania Medical College.

**AN ANALYTICAL COMPENDIUM OF THE VARIOUS BRANCHES OF MEDICAL SCIENCE;** for the Use and Examination of Students. A new edition, revised and improved. In one very large and handsomely printed royal 12mo. volume, of about one thousand pages, with 374 wood-cuts. Strongly bound in leather, with raised bands. \$3 00.

The very flattering reception which has been accorded to this work, and the high estimate placed upon it by the profession, as evinced by the constant and increasing demand which has rapidly exhausted two large editions, have stimulated the authors to render the volume in its present revision more worthy of the success which has attended it. It has accordingly been thoroughly examined, and such errors as had on former occasions escaped observation have been corrected, and whatever additions were necessary to maintain it on a level with the advance of science have been introduced. The extended series of illustrations has been still further increased and much improved, while, by a slight enlargement of the page, these various additions have been incorporated without increasing the bulk of the volume.

The work is, therefore, again presented as eminently worthy of the favor with which it has hitherto been received. As a book for daily reference by the student requiring a guide to his more elaborate text-books, as a manual for preceptors desiring to stimulate their students by frequent and accurate examination, or as a source from which the practitioners of older date may easily and cheaply acquire a knowledge of the changes and improvement in professional science, its reputation is permanently established.

The best work of the kind with which we are acquainted.—*Med. Examiner.*

Having made free use of this volume in our examinations of pupils, we can speak from experience in recommending it as an admirable compend for students, and as especially useful to preceptors who examine their pupils. It will save the teacher much labor by enabling him readily to recall all of the points upon which his pupils should be examined. A work of this sort should be in the hands of every one who takes pupils into his office with a view of examining them; and this is unquestionably the best of its class.—*Transylvania Med. Journal.*

In the rapid course of lectures, where work for

the students is heavy, and review necessary for an examination, a compend is not only valuable, but it is almost a *sine qua non*. The one before us is, in most of the divisions, the most unexceptionable of all books of the kind that we know of. The newest and soundest doctrines and the latest improvements and discoveries are explicitly, though concisely, laid before the student. There is a class to whom we very sincerely commend this cheap book as worth its weight in silver—that class is the graduates in medicine of more than ten years' standing, who have not studied medicine since. They will perhaps find out from it that the science is not exactly now what it was when they left it off.—*The Stethoscope.*

NELIGAN (J. MOORE), M. D., M. R. I. A., &amp;c.

(A splendid work. Just Issued.)

**ATLAS OF CUTANEOUS DISEASES.** In one beautiful quarto volume, extra cloth, with splendid colored plates, presenting nearly one hundred elaborate representations of disease. \$4 50.


This beautiful volume is intended as a complete and accurate representation of all the varieties of Diseases of the Skin. While it can be consulted in conjunction with any work on Practice, it has especial reference to the author's "Treatise on Diseases of the Skin," so favorably received by the profession some years since. The publishers feel justified in saying that few more beautifully executed plates have ever been presented to the profession of this country.

Neligan's Atlas of Cutaneous Diseases supplies a long existing desideratum much felt by the largest class of our profession. It presents, in quarto size, 16 plates, each containing from 3 to 8 figures, and forming in all a total of 90 distinct representations of the different species of skin affections, grouped together in genera or families. The illustrations have been taken from nature, and have been copied with such fidelity that they present a striking picture of life; in which the reduced scale aptly serves to

give, at a *coup d'œil*, the remarkable peculiarities of each individual variety. And while thus the disease is rendered more definable, there is yet no loss of proportion incurred by the necessary concentration. Each figure is highly colored, and so truthful has the artist been that the most fastidious observer could not justly take exception to the correctness of the execution of the pictures under his scrutiny.—*Montreal Med. Chronicle.*

BY THE SAME AUTHOR.

**A PRACTICAL TREATISE ON DISEASES OF THE SKIN.** Third American edition. In one neat royal 12mo. volume, extra cloth, of 334 pages. \$1 00.

 The two volumes will be sent by mail on receipt of *Five Dollars*.

**OWEN ON THE DIFFERENT FORMS OF THE SKELETON, AND OF THE TEETH.**

One vol. royal 12mo., extra cloth with numerous illustrations. \$1 25.

PIRRIE (WILLIAM), F. R. S. E.,

Professor of Surgery in the University of Aberdeen.

**THE PRINCIPLES AND PRACTICE OF SURGERY.** Edited by JOHN NEILL, M. D., Professor of Surgery in the Penna. Medical College, Surgeon to the Pennsylvania Hospital, &c. In one very handsome octavo volume, leather, of 780 pages, with 316 illustrations. \$3 75.

We know of no other surgical work of a reasonable size, wherein there is so much theory and practice, or where subjects are more soundly or clearly taught.—*The Stethoscope.*

*Prof. Pirrie, in the work before us, has elaborately discussed the principles of*

*safe and effectual practice. Perhaps no work upon it is so full upon the Nashville Journal.*

**PARRISH (EDWARD),**

Lecturer on Practical Pharmacy and Materia Medica in the Pennsylvania Academy of Medicine, &c.

**AN INTRODUCTION TO PRACTICAL PHARMACY.** Designed as a Text-Book for the Student, and as a Guide for the Physician and Pharmaceutist. With many Formulæ and Prescriptions. Second edition, greatly enlarged and improved. In one handsome octavo volume of 720 pages, with several hundred Illustrations, extra cloth. \$3 50. (*Just Issued.*)

During the short time in which this work has been before the profession, it has been received with very great favor, and in assuming the position of a standard authority, it has filled a vacancy which had been severely felt. Stimulated by this encouragement, the author, in availing himself of the opportunity of revision, has spared no pains to render it more worthy of the confidence bestowed upon it, and his assiduous labors have made it rather a new book than a new edition, many portions having been rewritten, and much new and important matter added. These alterations and improvements have been rendered necessary by the rapid progress made by pharmaceutical science during the last few years, and by the additional experience obtained in the practical use of the volume as a text-book and work of reference. To accommodate these improvements, the size of the page has been materially enlarged, and the number of pages considerably increased, presenting in all nearly *one-half more* matter than the last edition. The work is therefore now presented as a complete exponent of the subject in its most advanced condition. From the most ordinary matters in the dispensing office, to the most complicated details of the vegetable alkaloids, it is hoped that everything requisite to the practising physician, and to the apothecary, will be found fully and clearly set forth, and that the new matter alone will be worth more than the very moderate cost of the work to those who have been consulting the previous edition.

That Edward Parrish, in writing a book upon practical Pharmacy some few years ago—one eminently original and unique—did the medical and pharmaceutical professions a great and valuable service, no one, we think, who has had access to its pages will deny; doubly welcome, then, is this new edition, containing the added results of his recent and rich experience as an observer, teacher, and practical operator in the pharmaceutical laboratory. The excellent plan of the first is more thoroughly, and in detail, carried out in this edition.—*Peninsular Med. Journal*, Jan. 1860.

Of course, all apothecaries who have not already a copy of the first edition will procure one of this; it is, therefore, to physicians residing in the country and in small towns, who cannot avail themselves of the skill of an educated pharmaceutist, that we would especially commend this work. In it they

will find all that they desire to know, and should know, but very little of which they do really know in reference to this important collateral branch of their profession; for it is a well established fact, that, in the education of physicians, while the science of medicine is generally well taught, very little attention is paid to the art of preparing them for use, and we know not how this defect can be so well remedied as by procuring and consulting Dr. Parrish's excellent work.—*St. Louis Med. Journal*, Jan. 1860.

We know of no work on the subject which would be more indispensable to the physician or student desiring information on the subject of which it treats. With Griffith's "Medical Formulary" and this, the practising physician would be supplied with nearly or quite all the most useful information on the subject.—*Charleston Med. Jour. and Review*, Jan. 1860.

**PEASLEE (E. R.), M. D.,**

Professor of Physiology and General Pathology in the New York Medical College.

**HUMAN HISTOLOGY**, in its relations to Anatomy, Physiology, and Pathology; for the use of Medical Students. With four hundred and thirty-four illustrations. In one handsome octavo volume, of over 600 pages. (*Lately Published.*) \$3 75.

It embraces a library upon the topics discussed within itself, and is just what the teacher and learner need. Another advantage, by no means to be overlooked, everything of real value in the wide range which it embraces, is with great skill compressed into an octavo volume of but little more than six hundred pages. We have not only the whole subject of Histology, interesting in itself, ably and fully discussed, but what is of infinitely greater interest to the student, because of greater practical value, are its relations to Anatomy, Physiology, and Pathology, which are here fully and satisfactorily set forth.—*Nashville Journ. of Med. and Surgery*, Dec. 1857.

We would recommend it to the medical student and practitioner, as containing a summary of all that is known of the important subjects which it treats; of all that is contained in the great works of Simon and Lehmann, and the organic chemists in general. Master this one volume, we would say to the medical student and practitioner—master this book and you know all that is known of the great fundamental principles of medicine, and we have no hesitation in saying that it is an honor to the American medical profession that one of its members should have produced it.—*St. Louis Med. and Surg. Journal*, March, 1858.

**PEREIRA (JONATHAN), M. D., F. R. S., AND L. S.**

**THE ELEMENTS OF MATERIA MEDICA AND THERAPEUTICS.**

Third American edition, enlarged and improved by the author; including Notices of most of the Medicinal Substances in use in the civilized world, and forming an Encyclopedia of Materia Medica. Edited, with Additions, by JOSEPH CARSON, M. D., Professor of Materia Medica and Pharmacy in the University of Pennsylvania. In two very large octavo volumes of 2100 pages, on small type, with about 500 illustrations on stone and wood, strongly bound in leather, with raised bands. \$9 00.

\* \* \* Vol. II. will no longer be sold separate.

**PARKER (LANGSTON),**

Surgeon to the Queen's Hospital, Birmingham.

**THE MODERN TREATMENT OF SYPHILITIC DISEASES, BOTH PRIMARY AND SECONDARY;** comprising the Treatment of Constitutional and Confirmed Syphilis, by a safe and successful method. With numerous Cases, Formulæ, and Clinical Observa-

ons. From the Third and entirely rewritten London edition. In one neat octavo volume, cloth, of 316 pages. \$1 75.

**MATERIA MEDICA AND THERAPEUTICS;** including the of the Pharmacopœias of London, Edinburgh, Dublin, and of the United States medicines. Edited by JOSEPH CARSON, M. D. With ninety-eight illustrations. Two volume, extra cloth, of about 700 pages. \$3 00.

RAMSBOTHAM (FRANCIS H.), M. D.

**THE PRINCIPLES AND PRACTICE OF OBSTETRIC MEDICINE AND**

**SURGERY**, in reference to the Process of Parturition. A new and enlarged edition, thoroughly revised by the Author. With Additions by W. V. KEATING, M. D., Professor of Obstetrics, &c., in the Jefferson Medical College, Philadelphia. In one large and handsome imperial octavo volume, of 650 pages, strongly bound in leather, with raised bands; with sixty-four beautiful Plates, and numerous Wood-cuts in the text, containing in all nearly 200 large and beautiful figures. \$5 00.

*From Prof. Hodge, of the University of Pa.*

To the American public, it is most valuable, from its intrinsic undoubted excellence, and as being the best authorized exponent of British Midwifery. Its circulation will, I trust, be extensive throughout our country.

It is unnecessary to say anything in regard to the utility of this work. It is already appreciated in our country for the value of the matter, the clearness of its style, and the fulness of its illustrations. To the physician's library it is indispensable, while to the student as a text-book, from which to extract the material for laying the foundation of an education on obstetrical science, it has no superior.—*Ohio Med. and Surg. Journal*.

The publishers have secured its success by the

truly elegant style in which they have brought it out, excelling themselves in its production, especially in its plates. It is dedicated to Prof. Meigs, and has the emphatic endorsement of Prof. Hodge, as the best exponent of British Midwifery. We know of no text-book which deserves in all respects to be more highly recommended to students, and we could wish to see it in the hands of every practitioner, for they will find it invaluable for reference.—*Med. Gazette*.

RICORD (P.), M. D.

**A TREATISE ON THE VENEREAL DISEASE.** By JOHN HUNTER, F. R. S.

With copious Additions, by PH. RICORD, M. D. Translated and Edited, with Notes, by FREEMAN J. BUMSTEAD, M. D., Lecturer on Venereal at the College of Physicians and Surgeons, New York. Second edition, revised, containing a *résumé* of RICORD'S RECENT LECTURES ON CHANCERE. In one handsome octavo volume, extra cloth, of 550 pages, with eight plates. \$3 25. (*Just Issued.*)

In revising this work, the editor has endeavored to introduce whatever matter of interest the recent investigations of syphilographers have added to our knowledge of the subject. The principal source from which this has been derived is the volume of "Lectures on Chancre," published a few months since by M. Ricord, which affords a large amount of new and instructive material on many controverted points. In the previous edition, M. Ricord's additions amounted to nearly one-third of the whole, and with the matter now introduced, the work may be considered to present his views and experience more thoroughly and completely than any other.

Every one will recognize the attractiveness and value which this work derives from thus presenting the opinions of these two masters side by side. But, it must be admitted, what has made the fortune of the book, is the fact that it contains the "most complete embodiment of the veritable doctrines of the Hôpital du Midi," which has ever been made public. The doctrinal ideas of M. Ricord, ideas which, if not universally adopted, are incontestably dominant, have heretofore only been interpreted by more or less skillful

secretaries, sometimes accredited and sometimes not.

In the notes to Hunter, the master substitutes himself for his interpreters, and gives his original thoughts to the world in a lucid and perfectly intelligible manner. In conclusion we can say that this is incontestably the best treatise on syphilis with which we are acquainted, and, as we do not often employ the phrase, we may be excused for expressing the hope that it may find a place in the library of every physician.—*Virginia Med. and Surg. Journal*.

BY THE SAME AUTHOR.

**RICORD'S LETTERS ON SYPHILIS.** Translated by W. P. LATTIMORE, M. D.

In one neat octavo volume, of 270 pages, extra cloth. \$2 00.

SLADE (D. D.), M. D.

**DIPHThERIA; its Nature and Treatment, with an Account of the History of its**

Prevalence in various countries. Being the Dissertation to which the Fiske Fund Prize was awarded, July 11, 1860. In one small octavo volume, extra cloth; 75 cents. (*Now Ready, 1861.*)

ROKITANSKY (CARL), M. D.,

Curator of the Imperial Pathological Museum, and Professor at the University of Vienna, &c.

**A MANUAL OF PATHOLOGICAL ANATOMY.** Four volumes, octavo,

bound in two, extra cloth, of about 1200 pages. Translated by W. E. SWAINE, EDWARD SIEVEKING, C. H. MOORE, and G. E. DAY. \$5 50.

The profession is too well acquainted with the reputation of Rokitsansky's work to need our assurance that this is one of the most profound, thorough, and valuable books ever issued from the medical press. It is *swi generis*, and has no standard of comparison. It is only necessary to announce that it is issued in a form as cheap as is compatible with its size and preservation, and its sale follows as a matter of course. No library can be called complete without it.—*Buffalo Med. Journal*.

An attempt to give our readers any adequate idea of the vast amount of instruction accumulated in these volumes, would be feeble and hopeless. The effort of the distinguished author to concentrate in a small space his great fund of knowledge, has

so charged his text with valuable truths, that any attempt of a reviewer to epitomize is at once paralyzed, and must end in a failure.—*Western Lancet*.

As this is the highest source of knowledge upon the important subject of which it treats, no real student can afford to be without it. The American publishers have entitled themselves to the thanks of the profession of their country, for this timely and beautiful edition.—*Nashville Journal of Medicine*.

As a book of reference, therefore, this work must prove of inestimable value, and we cannot too highly recommend it to the profession.—*Charleston Med. Journal and Review*.

This book is a necessity to every practitioner.—*Am. Med. Monthly*.

RIGBY (EDWARD), M. D.,

Senior Physician to the General Lying-in Hospital, &c.

**A SYSTEM OF MIDWIFERY.** With Notes and Additional Illustrations.

Second American Edition. One volume octavo, extra cloth, 422 pages. \$2 50.

BY THE SAME AUTHOR. (*Lately Published.*)**ON THE CONSTITUTIONAL TREATMENT OF FEMALE DISEASES.**

In one neat royal 12mo. volume, extra cloth, of about 250 pages. \$1 00.

STILLE (ALFRED), M. D.

**THERAPEUTICS AND MATERIA MEDICA; a Systematic Treatise on the**

Action and Uses of Medicinal Agents, including their Description and History. In two large and handsome octavo volumes, of 1789 pages. (Just Issued, 1860.) \$8 00.

This work is designed especially for the student and practitioner of medicine, and treats the various articles of the *Materia Medica* from the point of view of the bed-side, and not of the shop or of the lecture-room. While thus endeavoring to give all practical information likely to be useful with respect to the employment of special remedies in special affections, and the results to be anticipated from their administration, a copious Index of Diseases and their Remedies renders the work eminently fitted for reference by showing at a glance the different means which have been employed, and enabling the practitioner to extend his resources in difficult cases with all that the experience of the profession has suggested.

Rarely, indeed, have we had submitted to us a work on medicine so ponderous in its dimensions as that now before us, and yet so fascinating in its contents. It is, therefore, with a peculiar gratification that we recognize in Dr. Stille the possession of many of those more distinguished qualifications which entitle him to approbation, and which justify him in coming before his medical brethren as an instructor. A comprehensive knowledge, tested by a sound and penetrating judgment, joined to a love of progress—which a discriminating spirit of inquiry has tempered so as to accept nothing new because it is new, and abandon nothing old because it is old, but which estimates either according to its relations to a just logic and experience—manifests itself everywhere, and gives to the guidance of the author all the assurance of safety which the difficulties of his subject can allow. In conclusion, we earnestly advise our readers to ascertain for themselves, by a study of Dr. Stille's volumes, the great value and interest of the stores of knowledge they present. We have pleasure in referring rather to the ample treasury of undoubted truths, the real and assured conquest of medicine, accumulated by Dr. Stille in his pages; and commend the sum of his labors to the attention of our readers, as alike honorable to our science, and creditable to the zeal, the candor, and the judgment of him who has garnered the whole so carefully.—*Edinburgh Med. Journal*.

Our expectations of the value of this work were based on the well-known reputation and character of the author as a man of scholarly attainments, an elegant writer, a candid inquirer after truth, and a philosophical thinker; we knew that the task would be conscientiously performed, and that few, if any, among the distinguished medical teachers in this country are better qualified than he to prepare a systematic treatise on therapeutics in accordance with the present requirements of medical science. Our preliminary examination of the work has satis-

fied us that we were not mistaken in our anticipations.—*New Orleans Medical News*, March, 1860.

The most recent authority is the one last mentioned, Stille. His great work on "*Materia Medica and Therapeutics*," published last year, in two octavo volumes, of some sixteen hundred pages, while it embodies the results of the labor of others up to the time of publication, is enriched with a great amount of original observation and research. We would draw attention, by the way, to the very convenient mode in which the *Index* is arranged in this work. There is first an "*Index of Remedies*;" next an "*Index of Diseases and their Remedies*." Such an arrangement of the Indices, in our opinion, greatly enhances the practical value of books of this kind. In tedious, obstinate cases of disease, where we have to try one remedy after another until our stock is pretty nearly exhausted, and we are almost driven to our wit's end, such an index as the second of the two just mentioned, is precisely what we want.—*London Med. Times and Gazette*, April, 1861.

We think this work will do much to obviate the reluctance to a thorough investigation of this branch of scientific study, for in the wide range of medical literature treasured in the English tongue, we shall hardly find a work written in a style more clear and simple, conveying forcibly the facts taught, and yet free from turgidity and redundancy. There is a fascination in its pages that will insure to it a wide popularity and attentive perusal, and a degree of usefulness not often attained through the influence of a single work. The author has much enhanced the practical utility of his book by passing briefly over the physical, botanical, and commercial history of medicines, and directing attention chiefly to their physiological action, and their application for the amelioration or cure of disease. He ignores hypothesis and theory which are so alluring to many medical writers, and so liable to lead them astray, and confines himself to such facts as have been tried in the crucible of experience.—*Chicago Medical Journal*.

SMITH (HENRY H.), M. D.

**MINOR SURGERY; or, Hints on the Every-day Duties of the Surgeon.** With 247 illustrations. Third edition. 1 vol. royal 12mo., pp. 456. In leather, \$2 25; cloth, \$2 00.

BY THE SAME AUTHOR, AND

HORNER (WILLIAM E.), M. D.,

Late Professor of Anatomy in the University of Pennsylvania.

**AN ANATOMICAL ATLAS, illustrative of the Structure of the Human Body.**

In one volume, large imperial octavo, extra cloth, with about six hundred and fifty beautiful figures. \$3 00.

These figures are well selected, and present a complete and accurate representation of that wonderful fabric, the human body. The plan of this Atlas, which renders it so peculiarly convenient for the student, and its superb artistical execution, have been already pointed out. We must congrat-

ulate the student upon the completion of this Atlas, as it is the most convenient work of the kind that has yet appeared; and we must add, the very beautiful manner in which it is "got up" is so creditable to the country as to be flattering to our national pride.—*American Medical Journal*.

SHARPEY (WILLIAM), M. D., JONES QUAIN, M. D., AND

RICHARD QUAIN, F. R. S., &amp;c.

**HUMAN ANATOMY.** Revised, with Notes and Additions, by JOSEPH LEIDY,

M. D., Professor of Anatomy in the University of Pennsylvania. Complete in two large octavo volumes, leather, of about thirteen hundred pages. Beautifully illustrated with over five hundred engravings on wood. \$6 00.

SIMPSON (J. Y.), M. D.,

Professor of Midwifery, &amp;c., in the University of Edinburgh, &amp;c.

**CLINICAL LECTURES ON THE DISEASES OF FEMALES.** With numerous illustrations.

This valuable series of practical Lectures is now appearing in the "*MEDICAL NEWS AND LIBRARY*" for 1860 and 1861, and can thus be had without cost by subscribers to the "*AMERICAN JOURNAL OF THE MEDICAL SCIENCES*." See p. 2.

SARGENT (F. W.), M. D.

**ON BANDAGING AND OTHER OPERATIONS OF MINOR SURGERY.**

Second edition, enlarged. One handsome royal 12mo. vol., of nearly 400 pages, with 182 wood-cuts. Extra cloth, \$1 40; leather, \$1 50.

Sargent's Minor Surgery has always been popular, and deservedly so. It furnishes that knowledge of the most frequently requisite performances of surgical art which cannot be entirely understood by attending clinical lectures. The art of bandaging, which is regularly taught in Europe, is very frequently overlooked by teachers in this country; the student and junior practitioner, therefore, may often require that knowledge which this little volume so tersely and happily supplies.—*Charleston Med. Journ. and Review.*

A work that has been so long and favorably known to the profession as Dr. Sargent's Minor Surgery, needs no commendation from us. We would remark, however, in this connection, that minor surgery seldom gets that attention in our schools that its importance deserves. Our larger works are also very defective in their teaching on these small practical points. This little book will supply the void which all must feel who have not studied its pages.—*Western Lancet.*

SMITH (W. TYLER), M. D.,

Physician Accoucheur to St. Mary's Hospital, &amp;c.

**ON PARTURITION, AND THE PRINCIPLES AND PRACTICE OF OBSTETRICS.** In one royal 12mo. volume, extra cloth, of 400 pages. \$1 25.

BY THE SAME AUTHOR.

**A PRACTICAL TREATISE ON THE PATHOLOGY AND TREATMENT OF LEUCORRHOEA.** With numerous illustrations. In one very handsome octavo volume, extra cloth, of about 250 pages. \$1 50.

**SOLLY ON THE HUMAN BRAIN;** its Structure, Physiology, and Diseases. From the Second and much enlarged London edition. In one octavo volume, extra cloth, of 500 pages, with 120 wood-cuts. \$2 00.

handsome octavo volume, extra cloth, of over 650 pages, with about one hundred wood-cuts. \$3 25.

**SIMON'S GENERAL PATHOLOGY,** as conducive to the Establishment of Rational Principles for the prevention and Cure of Disease. In one octavo volume, extra cloth, of 212 pages. \$1 25.

**SKEY'S OPERATIVE SURGERY.** In one very

TANNER (T. H.), M. D.,

Physician to the Hospital for Women, &amp;c.

**A MANUAL OF CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS.**

To which is added The Code of Ethics of the American Medical Association. Second American Edition. In one neat volume, small 12mo., extra cloth, 87½ cents.

TAYLOR (ALFRED S.), M. D., F. R. S.,

Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital.

**MEDICAL JURISPRUDENCE.** Fifth American, from the seventh improved and enlarged London edition. With Notes and References to American Decisions, by EDWARD HARTSHORNE, M. D. In one large octavo volume, leather, of over 700 pages. (*Nearly Ready.*)

This standard work having had the advantage of two revisions at the hands of the author since the appearance of the last American edition, will be found thoroughly revised and brought up completely to the present state of the science. As a work of authority, it must therefore maintain its position, both as a text-book for the student, and a compendious treatise to which the practitioner can at all times refer in cases of doubt or difficulty.

No work upon the subject can be put into the hands of students either of law or medicine which will engage them more closely or profitably; and none could be offered to the busy practitioner of either calling, for the purpose of casual or hasty reference, that would be more likely to afford the aid desired. We therefore recommend it as the best and safest manual for daily use.—*American Journal of Medical Sciences.*

It is not excess of praise to say that the volume before us is the very best treatise extant on Medical Jurisprudence. In saying this, we do not wish to be understood as detracting from the merits of the excellent works of Beck, Ryan, Traill, Guy, and others; but in interest and value we think it must be conceded that Taylor is superior to anything that has preceded it.—*N. W. Medical and Surg. Journal.*

It is at once comprehensive and eminently practical, and by universal consent stands at the head of

American and British legal medicine. It should be in the possession of every physician, as the subject is one of great and increasing importance to the public as well as to the profession.—*St. Louis Med. and Surg. Journal.*

This work of Dr. Taylor's is generally acknowledged to be one of the ablest extant on the subject of medical jurisprudence. It is certainly one of the most attractive books that we have met with; supplying so much both to interest and instruct, that we do not hesitate to affirm that after having once commenced its perusal, few could be prevailed upon to desist before completing it. In the last London edition, all the newly observed and accurately recorded facts have been inserted, including much that is recent of Chemical, Microscopical, and Pathological research, besides papers on numerous subjects never before published.—*Charleston Med. Journal and Review.*

BY THE SAME AUTHOR. (*New Edition, just issued.*)**ON POISONS, IN RELATION TO MEDICAL JURISPRUDENCE AND MEDICINE.** Second American, from a second and revised London edition. In one large octavo volume, of 755 pages, leather. \$3 50.

Since the first appearance of this work, the rapid advance of Chemistry has introduced into use many new substances which may become fatal through accident or design—while at the same time it has likewise designated new and more exact modes of counteracting or detecting those previously treated of. Mr. Taylor's position as the leading medical jurist of England, has during this period conferred on him extraordinary advantages in acquiring experience on these subjects, nearly all cases of moment being referred to him for examination, as an expert whose testimony is generally accepted as final. The results of his labors, therefore, as gathered together in this volume, carefully weighed and sifted, and presented in the clear and intelligible style for which he is noted, may be received as an acknowledged authority, and as a guide to be followed with explicit confidence.

**TODD (ROBERT BENTLEY), M. D., F. R. S.,**

Professor of Physiology in King's College, London; and

**WILLIAM BOWMAN, F. R. S.,**

Demonstrator of Anatomy in King's College, London.

**THE PHYSIOLOGICAL ANATOMY AND PHYSIOLOGY OF MAN.** With about three hundred large and beautiful illustrations on wood. Complete in one large octavo volume, of 950 pages, leather. Price \$4 50.

Gentlemen who have received portions of this work, as published in the "MEDICAL NEWS AND LIBRARY," can now complete their copies, if immediate application be made. It will be furnished as follows, free by mail, in paper covers, with cloth backs.

PARTS I., II., III. (pp. 25 to 552), \$2 50.

PART IV. (pp. 553 to end, with Title, Preface, Contents, &c.), \$2 00.

Or, PART IV., SECTION II. (pp. 725 to end, with Title, Preface, Contents, &c.), \$1 25.

A magnificent contribution to British medicine, and the American physician who shall fail to peruse it, will have failed to read one of the most instructive books of the nineteenth century.—*N. O. Med and Surg. Journal*, Sept. 1857.

It is more concise than Carpenter's Principles, and more modern than the accessible edition of Müller's Elements; its details are brief, but sufficient; its descriptions vivid; its illustrations exact and copious; and its language terse and perspicuous.—*Charleston Med. Journal*, July, 1857.

We know of no work on the subject of physiology

so well adapted to the wants of the medical student. Its completion has been thus long delayed, that the authors might secure accuracy by personal observation.—*St. Louis Med. and Surg. Journal*, Sept. '57.

Our notice, though it conveys but a very feeble and imperfect idea of the magnitude and importance of the work now under consideration, already transcends our limits; and, with the indulgence of our readers, and the hope that they will peruse the book for themselves, as we feel we can with confidence recommend it, we leave it in their hands.—*The Northwestern Med. and Surg. Journal*.

**TODD (R. B.) M. D., F. R. S., &c.**

**CLINICAL LECTURES ON CERTAIN DISEASES OF THE URINARY ORGANS AND ON DROPSIES.** In one octavo volume, 284 pages. \$1 50.

BY THE SAME AUTHOR. (*Now Ready.*)

**CLINICAL LECTURES ON CERTAIN ACUTE DISEASES.** In one neat octavo volume, of 320 pages, extra cloth. \$1 75.

**TOYNBEE (JOSEPH), F. R. S.,**

Aural Surgeon to, and Lecturer on Surgery at, St. Mary's Hospital.

**A PRACTICAL TREATISE ON DISEASES OF THE EAR; their Diagnosis, Pathology, and Treatment.** Illustrated with one hundred engravings on wood. In one very handsome octavo volume, extra cloth, \$3 00. (*Just Issued.*)

The work, as was stated at the outset of our notice, is a model of its kind, and every page and paragraph of it are worthy of the most thorough study. Considered all in all—as an original work, well written, philosophically elaborated, and happily illustrated with cases and drawings—it is by far the ablest monograph that has ever appeared on the anatomy and diseases of the ear, and one of the most valuable contributions to the art and science of surgery in the nineteenth century.—*N. Amer. Medico-Chirurg. Review*, Sept. 1860.

To recommend such a work, even after the mere hint we have given of its original excellence and value, would be a work of supererogation. We are speaking within the limits of modest acknowledg-

ment, and with a sincere and unbiassed judgment, when we affirm that as a treatise on Aural Surgery, it is without a rival in our language or any other.—*Charleston Med. Journ. and Review*, Sept. 1860.

The work of Mr. Toynbee is undoubtedly, upon the whole, the most valuable production of the kind in any language. The author has long been known by his numerous monographs upon subjects connected with diseases of the ear, and is now regarded as the highest authority on most points in his department of science. Mr. Toynbee's work, as we have already said, is undoubtedly the most reliable guide for the study of the diseases of the ear in any language, and should be in the library of every physician.—*Chicago Med. Journal*, July, 1860.

**WILLIAMS (C. J. B.), M. D., F. R. S.,**

Professor of Clinical Medicine in University College, London, &c.

**PRINCIPLES OF MEDICINE.** An Elementary View of the Causes, Nature, Treatment, Diagnosis, and Prognosis of Disease; with brief remarks on Hygienics, or the preservation of health. A new American, from the third and revised London edition. In one octavo volume, leather, of about 500 pages. \$2 50. (*Just Issued.*)

We find that the deeply-interesting matter and style of this book have so far fascinated us, that we have unconsciously hung upon its pages, not too long, indeed, for our own profit, but longer than reviewers can be permitted to indulge. We leave the further analysis to the student and practitioner. Our judgment of the work has already been sufficiently

expressed. It is a judgment of almost unqualified praise.—*London Lancet*.

A text-book to which no other in our language is comparable.—*Charleston Medical Journal*.

No work has ever achieved or maintained a more deserved reputation.—*Va. Med. and Surg. Journal*.

#### WHAT TO OBSERVE

**AT THE BEDSIDE AND AFTER DEATH, IN MEDICAL CASES.**

Published under the authority of the London Society for Medical Observation. A new American, from the second and revised London edition. In one very handsome volume, royal 12mo., extra cloth. \$1 00.

To the observer who prefers accuracy to blunders and precision to carelessness, this little book is invaluable.—*N. H. Journal of Medicine*.

One of the finest aids to a young practitioner we have ever seen.—*Peninsular Journal of Medicine*.

**New and much enlarged edition—(Just Issued.)**

**WATSON (THOMAS), M. D., &c.,**  
Late Physician to the Middlesex Hospital, &c.

**LECTURES ON THE PRINCIPLES AND PRACTICE OF PHYSIC.**

Delivered at King's College, London. A new American, from the last revised and enlarged English edition, with Additions, by D. FRANCIS CONDIE, M. D., author of "A Practical Treatise on the Diseases of Children," &c. With one hundred and eighty-five illustrations on wood. In one very large and handsome volume, imperial octavo, of over 1200 closely printed pages in small type; the whole strongly bound in leather, with raised bands. Price \$4 25.

That the high reputation of this work might be fully maintained, the author has subjected it to a thorough revision; every portion has been examined with the aid of the most recent researches in pathology, and the results of modern investigations in both theoretical and practical subjects have been carefully weighed and embodied throughout its pages. The watchful scrutiny of the editor has likewise introduced whatever possesses immediate importance to the American physician in relation to diseases incident to our climate which are little known in England, as well as those points in which experience here has led to different modes of practice; and he has also added largely to the series of illustrations, believing that in this manner valuable assistance may be conveyed to the student in elucidating the text. The work will, therefore, be found thoroughly on a level with the most advanced state of medical science on both sides of the Atlantic.

The additions which the work has received are shown by the fact that notwithstanding an enlargement in the size of the page, more than two hundred additional pages have been necessary to accommodate the two large volumes of the London edition (which sells at ten dollars), within the compass of a single volume, and in its present form it contains the matter of at least three ordinary octavos. Believing it to be a work which should lie on the table of every physician, and be in the hands of every student, the publishers have put it at a price within the reach of all, making it one of the cheapest books as yet presented to the American profession, while at the same time the beauty of its mechanical execution renders it an exceedingly attractive volume.

The fourth edition now appears, so carefully revised, as to add considerably to the value of a book already acknowledged, wherever the English language is read, to be beyond all comparison the best systematic work on the Principles and Practice of Physic in the whole range of medical literature. Every lecture contains proof of the extreme anxiety of the author to keep pace with the advancing knowledge of the day, and to bring the results of the labors, not only of physicians, but of chemists and histologists, before his readers, wherever they can be turned to useful account. And this is done with such a cordial appreciation of the merit due to the industrious observer, such a generous desire to encourage younger and rising men, and such a candid acknowledgment of his own obligations to them, that one scarcely knows whether to admire most the pure, simple, forcible English—the vast amount of useful practical information condensed into the Lectures—or the manly, kind-hearted, unassuming character of the lecturer shining through his work.—*London Med. Times and Gazette.*

Thus these admirable volumes come before the profession in their fourth edition, abounding in those distinguished attributes of moderation, judgment, erudite cultivation, clearness, and eloquence, with which they were from the first invested, but yet richer than before in the results of more prolonged observation, and in the able appreciation of the latest advances in pathology and medicine by one of the most profound medical thinkers of the day.—*London Lancet.*

The lecturer's skill, his wisdom, his learning, are equalled by the ease of his graceful diction, his eloquence, and the far higher qualities of candor, of courtesy, of modesty, and of generous appreciation of merit in others. May he long remain to instruct us, and to enjoy, in the glorious sunset of his declining years, the honors, the confidence and love gained during his useful life.—*N. A. Med.-Chir. Review.*

Watson's unrivalled, perhaps unapproachable work on Practice—the copious additions made to which (the fourth edition) have given it all the novelty and much of the interest of a new book.—*Charleston Med. Journal.*

Lecturers, practitioners, and students of medicine will equally hail the reappearance of the work of Dr. Watson in the form of a new—a fourth—edition. We merely do justice to our own feelings, and, we are sure, of the whole profession, if we thank him for having, in the trouble and turmoil of a large practice, made leisure to supply the hiatus caused by the exhaustion of the publisher's stock of the third edition, which has been severely felt for the last three years. For Dr. Watson has not merely caused the lectures to be reprinted, but scattered through the whole work we find additions or alterations which prove that the author has in every way sought to bring up his teaching to the level of the most recent acquisitions in science.—*Brit. and For. Medico-Chir. Review.*

**WALSHE (W. H.), M. D.,**

Professor of the Principles and Practice of Medicine in University College, London, &c.

**A PRACTICAL TREATISE ON DISEASES OF THE LUNGS; including the Principles of Physical Diagnosis.** A new American, from the third revised and much enlarged London edition. In one vol. octavo, of 468 pages. (Just Issued, June, 1860.) \$2 25.

The present edition has been carefully revised and much enlarged, and may be said in the main to be rewritten. Descriptions of several diseases, previously omitted, are now introduced; the causes and mode of production of the more important affections, so far as they possess direct practical significance, are succinctly inquired into; an effort has been made to bring the description of anatomical characters to the level of the wants of the practical physician; and the diagnosis and prognosis of each complaint are more completely considered. The sections on TREATMENT and the Appendix (concerning the influence of climate on pulmonary disorders), have, especially, been largely extended.—*Author's Preface.*

\*\*\* To be followed by a similar volume on Diseases of the Heart and Aorta.

**WILSON (ERASMUS), F. R. S.,**

Lecturer on Anatomy, London.

**THE DISSECTOR'S MANUAL; or, Practical and Surgical Anatomy. Third**

American, from the last revised and enlarged English edition. Modified and rearranged, by WILLIAM HUNT, M. D., Demonstrator of Anatomy in the University of Pennsylvania. In one large and handsome royal 12mo. volume, leather, of 582 pages, with 154 illustrations. \$2 00.

New and much enlarged edition—(Just Issued.)

WILSON (ERASMUS), F. R. S.

**A SYSTEM OF HUMAN ANATOMY**, General and Special. A new and revised American, from the last and enlarged English Edition. Edited by W. H. GOBRECHT, M. D., Professor of Anatomy in the Pennsylvania Medical College, &c. Illustrated with three hundred and ninety-seven engravings on wood. In one large and exquisitely printed octavo volume, of over 600 large pages; leather. \$3 25.

The publishers trust that the well earned reputation so long enjoyed by this work will be more than maintained by the present edition. Besides a very thorough revision by the author, it has been most carefully examined by the editor, and the efforts of both have been directed to introducing everything which increased experience in its use has suggested as desirable to render it a complete text-book for those seeking to obtain or to renew an acquaintance with Human Anatomy. The amount of additions which it has thus received may be estimated from the fact that the present edition contains over one-fourth more matter than the last, rendering a smaller type and an enlarged page requisite to keep the volume within a convenient size. The author has not only thus added largely to the work, but he has also made alterations throughout, wherever there appeared the opportunity of improving the arrangement or style, so as to present every fact in its most appropriate manner, and to render the whole as clear and intelligible as possible. The editor has exercised the utmost caution to obtain entire accuracy in the text, and has largely increased the number of illustrations, of which there are about one hundred and fifty more in this edition than in the last, thus bringing distinctly before the eye of the student everything of interest or importance.

It may be recommended to the student as no less distinguished by its accuracy and clearness of description than by its typographical elegance. The wood-cuts are exquisite.—*Brit. and For. Medical Review*.

An elegant edition of one of the most useful and accurate systems of anatomical science which has been issued from the press. The illustrations are really beautiful. In its style the work is extremely concise and intelligible. No one can possibly take up this volume without being struck with the great

beauty of its mechanical execution, and the clearness of the descriptions which it contains is equally evident. Let students, by all means examine the claims of this work on their notice, before they purchase a text-book of the vitally important science which this volume so fully and easily unfolds.—*Lancet*.

We regard it as the best system now extant for students.—*Western Lancet*.

It therefore receives our highest commendation.—*Southern Med. and Surg. Journal*.

BY THE SAME AUTHOR. (Just Issued.)

**ON DISEASES OF THE SKIN.** Fourth and enlarged American, from the last and improved London edition. In one large octavo volume, of 650 pages, extra cloth, \$2 75.

The writings of Wilson, upon diseases of the skin, are by far the most scientific and practical that have ever been presented to the medical world on this subject. The present edition is a great improvement on all its predecessors. To dwell upon all the great merits and high claims of the work before us, *seriatim*, would indeed be an agreeable service; it would be a mental homage which we could freely offer, but we should thus occupy an undue amount of space in this *Journal*. We will, however, look

at some of the more salient points with which it abounds, and which make it incomparably superior in excellence to all other treatises on the subject of dermatology. No mere speculative views are allowed a place in this volume, which, without a doubt, will, for a very long period, be acknowledged as the chief standard work on dermatology. The principles of an enlightened and rational therapeia are introduced on every appropriate occasion.—*Am. Jour. Med. Science*, Oct. 1857.

ALSO, NOW READY,

**A SERIES OF PLATES ILLUSTRATING WILSON ON DISEASES OF THE SKIN**; consisting of nineteen beautifully executed plates, of which twelve are exquisitely colored, presenting the Normal Anatomy and Pathology of the Skin, and containing accurate representations of about one hundred varieties of disease, most of them the size of nature. Price in cloth \$4 25.

In beauty of drawing and accuracy and finish of coloring these plates will be found equal to anything of the kind as yet issued in this country.

The plates by which this edition is accompanied leave nothing to be desired, so far as excellence of delineation and perfect accuracy of illustration are concerned.—*Medico-Chirurgical Review*.

Of these plates it is impossible to speak too highly. The representations of the various forms of cutaneous disease are singularly accurate, and the coloring exceeds almost anything we have met with in point of delicacy and finish.—*British and Foreign Medical Review*.

We have already expressed our high appreciation of Mr. Wilson's treatise on Diseases of the Skin. The plates are comprised in a separate volume, which we counsel all those who possess the text to purchase. It is a beautiful specimen of color printing, and the representations of the various forms of skin disease are as faithful as is possible in plates of the size.—*Boston Med. and Surg. Journal*, April 8, 1858.

BY THE SAME AUTHOR.

**ON CONSTITUTIONAL AND HEREDITARY SYPHILIS, AND ON SYPHILITIC ERUPTIONS.** In one small octavo volume, extra cloth, beautifully printed, with four exquisite colored plates, presenting more than thirty varieties of syphilitic eruptions. \$2 25.

BY THE SAME AUTHOR.

**HEALTHY SKIN; A Popular Treatise on the Skin and Hair, their Preservation and Management.** Second American, from the fourth London edition. One neat volume, royal 12mo., extra cloth, of about 300 pages, with numerous illustrations. \$1 00; paper cover, 75 cents.

**WHITEHEAD ON THE CAUSES AND TREATMENT OF ABORTION AND STERILITY.**

Second American Edition. In one volume, octavo extra cloth, pp. 308. \$1 75.



WINSLOW (FORBES), M. D., D. C. L., &amp;c.

## ON OBSCURE DISEASES OF THE BRAIN AND DISORDERS OF THE

MIND; their incipient Symptoms, Pathology, Diagnosis, Treatment, and Prophylaxis. In one handsome octavo volume, of nearly 600 pages. (Just Issued.) \$3 00.

We close this brief and necessarily very imperfect notice of Dr. Winslow's great and classical work, by expressing our conviction that it is long since so important and beautifully written a volume has issued from the British medical press.—*Dublin Med. Press*, July 25, 1860.

We honestly believe this to be the best book of the season.—*Ranking's Abstract*, July, 1860.

It carried us back to our old days of novel reading, it kept us from our dinner, from our business, and from our slumbers; in short, we laid it down only when we had got to the end of the last paragraph, and even then turned back to the repelusal of several passages which we had marked as requiring further study. We have failed entirely in the above notice to give an adequate acknowledgment of the profit and pleasure with which we have perused the above work. We can only say to our readers, study it

yourselves; and we extend the invitation to unprofessional as well as professional men, believing that it contains matter deeply interesting not to physicians alone, but to all who appreciate the truth that: "The proper study of mankind is man."—*Nashville Medical Record*, July, 1860.

The latter portion of Dr. Winslow's work is exclusively devoted to the consideration of Cerebral Pathology. It completely exhausts the subject, in the same manner as the previous seventeen chapters relating to morbid psychical phenomena left nothing unnoticed in reference to the mental symptoms premonitory of cerebral disease. It is impossible to overrate the benefits likely to result from a general perusal of Dr. Winslow's valuable and deeply interesting work.—*London Lancet*, June 23, 1860.

It contains an immense mass of information.—*Brit. and For. Med.-Chir. Review*, Oct. 1860.

WEST (CHARLES), M. D.,

Accoucheur to and Lecturer on Midwifery at St. Bartholomew's Hospital, Physician to the Hospital for Sick Children, &c.

## LECTURES ON THE DISEASES OF WOMEN. Second American, from the second London edition. In one handsome octavo volume, extra cloth, of about 500 pages; price \$2 50. (Now Ready, July, 1861.)

\* \* \* Gentlemen who received the first portion, as issued in the "Medical News and Library," can now complete their copies by procuring Part II, being page 309 to end, with Index, Title matter, &c., 8vo., cloth, price \$1.

We must now conclude this hastily written sketch with the confident assurance to our readers that the work will well repay perusal. The conscientious, painstaking, practical physician is apparent on every page.—*N. Y. Journal of Medicine*, March, 1858.

We know of no treatise of the kind so complete and yet so compact.—*Chicago Med. Journal*, January, 1858.

A fairer, more honest, more earnest, and more reliable investigator of the many diseases of women and children is not to be found in any country.—*Southern Med. and Surg. Journal*, January 1858.

We gladly recommend his Lectures as in the highest degree instructive to all who are interested in obstetric practice.—*London Lancet*.

We have to say of it, briefly and decidedly, that it is the best work on the subject in any language; and that it stamps Dr. West as the *facile princeps* of British obstetric authors.—*Edinb. Med. Journ.*

As a writer, Dr. West stands, in our opinion, second only to Watson, the "Macaulay of Medicine;" he possesses that happy faculty of clothing instruction in easy garments; combining pleasure with profit, he leads his pupils, in spite of the ancient

proverb, along a royal road to learning. His work is one which will not satisfy the extreme on either side, but it is one that will please the great majority who are seeking truth, and one that will convince the student that he has committed himself to a candid, safe, and valuable guide. We anticipate with pleasure the appearance of the second part of the work, which, if it equals this part, will complete one of our very best volumes upon diseases of females.—*N. A. Med.-Chirurg. Review*, July, 1858.

Happy in his simplicity of manner, and moderate in his expression of opinion, the author is a sound reasoner and a good practitioner, and his book is worthy of the handsome garb in which it has appeared from the press of the Philadelphia publishers.—*Virginia Med. Journal*.

We must take leave of Dr. West's very useful work, with our commendation of the clearness of its style, and the industry and sobriety of judgment of which it gives evidence.—*London Med Times and Gazette*.

Sound judgment and good sense pervade every chapter of the book. From its perusal we have derived unmixed satisfaction.—*Dublin Quart. Journ.*

BY THE SAME AUTHOR. (Just Issued.)

## LECTURES ON THE DISEASES OF INFANCY AND CHILDHOOD.

Third American, from the fourth enlarged and improved London edition. In one handsome octavo volume, extra cloth, of about six hundred and fifty pages. \$2 75.

The three former editions of the work now before us have placed the author in the foremost rank of those physicians who have devoted special attention to the diseases of early life. We attempt no analysis of this edition, but may refer the reader to some of the chapters to which the largest additions have been made—those on Diphtheria, Disorders of the Mind, and Idiocy, for instance—as a proof that the work is really a new edition; not a mere reprint. In its present shape it will be found of the greatest possible service in the every-day practice of nine-tenths of the profession.—*Med. Times and Gazette*, London, Dec. 10, 1859.

All things considered, this book of Dr. West is by far the best treatise in our language upon such modifications of morbid action and disease as are witnessed when we have to deal with infancy and childhood. It is true that it confines itself to such disorders as come within the province of the physician, and even with respect to these it is unequal as regards minuteness of consideration, and some

diseases it omits to notice altogether. But those who know anything of the present condition of pædiatrics will readily admit that it would be next to impossible to effect more, or effect it better, than the accoucheur of St. Bartholomew's has done in a single volume. The lecture (XVI.) upon Disorders of the Mind in children is an admirable specimen of the value of the later information conveyed in the Lectures of Dr. Charles West.—*London Lancet*, Oct. 22, 1859.

Since the appearance of the first edition, about eleven years ago, the experience of the author has doubled; so that, whereas the lectures at first were founded on six hundred observations, and one hundred and eighty dissections made among nearly fourteen thousand children, they now embody the results of nine hundred observations, and two hundred and eighty-eight post-mortem examinations made among nearly thirty thousand children, who, during the past twenty years, have been under his care.—*British Med. Journal*, Oct. 1, 1859.

BY THE SAME AUTHOR.

## AN ENQUIRY INTO THE PATHOLOGICAL IMPORTANCE OF ULCERATION OF THE OS UTERI. In one neat octavo volume, extra cloth. \$1 00.



